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CHICAGO-O'HARE INTERNATIONAL AIRPORT

ENGINEERING REPORT
FIRST STAGE DEVELOPMENT PROGRAM

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CHICAGO - O'HARE INTERNATIONAL AIRPORT
ENGINEERING REPORT - FIRST STAGE DEVELOPMENT PROGRAM

CITY OF CHICAGO

RICHARD J. DALEY - MAYOR

GEORGE L. DEMENT - COMMISSIONER OF PUBLIC WORKS

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NAESS & MURPHY · ARCHITECTS · ENGINEERS

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November 14, 1958

Mr. George L. DeMent,
Commissioner of Public Works
City of Chicago
City Hall
Chicago, Illinois

Dear Commissioner DeMent:

Chicago - O'Hare International Airport
Engineering Report - First Stage
Development Program

Pursuant to the terms of our agreement dated March 1, 1957, we are presenting herewith our Engineering Report covering the first stage development of facilities at O'Hare Airport. This report develops engineering and cost data required to support the sale of revenue bonds to provide funds for construction of these facilities.

Included in the report, in addition to a description, outline specification and cost estimate for each major item of construction, are plan and perspective drawings which delineate the location, character and extent of the proposed facilities.

In general, the development program is planned to meet traffic estimates for the year 1965. Airline spaces provided in the terminal buildings and cargo buildings correspond directly to written requests from the airlines. Sites for hangars in the Hangar Area also correspond to airline requests. Spaces in the terminal buildings reserved for concessions, as well as paid parking facilities and sites for an automobile service station, an air mail post office, flight kitchens, rent-a-car service facilities, and a motel are based on the recommendations of Landrum and Brown, airport consultants of Cincinnati, Ohio.

The design of the fueling system, together with the cost estimates for this facility, were prepared by James P. O'Donnell, fueling consultant of New York City, in accordance with recommendations from the Airline Technical Committee.

Cost estimates for construction of all of the proposed facilities are based on current unit prices for the work involved, adjusted in several cases for increases anticipated prior to the estimated date of construction. No costs have been included for land acquisition since all of the land required for the proposed construction has already been acquired by the City and acquisition costs of the additional land required to complete the approved airport boundary have been authorized from existing general obligation bond funds of the City of Chicago.

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The proposed development program has been planned in close cooperation with our consultants, the Airline Technical Committee, the Technical Development Center of the Civil Aeronautics Administration and the Bureau of Aviation of the City of Chicago.

We believe that the first stage development program as outlined in this report can be completed and placed in operation within 33 months from the date that funds are available from the revenue bond issue.

Very truly yours,

NAESS & MURPHY

Charles D. Murphy

1 INTRODUCTION

I. INTRODUCTION

History: O'Hare Airport, as it exists today, had its beginning in planning studies initiated in the early 1940's by several civic organizations. In 1945 the City Council approved the site recommended by the Airport Site Selection Board. This site was the Douglas Airport constructed by the Federal Government during World War II in connection with an aircraft factory leased to the Douglas Aircraft Company.

In 1946 the War Assets Corporation, having declared the Douglas Airport as surplus, gave the City a quit-claim deed to 1,080 acres of the property. Planning was then begun to develop the site as an airport for civil aviation.

In May 1955, the City reached agreement with 17 airlines for landing and rental fees at the airport. The City Council approved this agreement in October of that year and in the same month the airport was opened for commercial use.

By this time the City had renamed the airport O'Hare, had acquired additional land and had constructed several improvements. These include a new runway, a taxi-way, a segment of a proposed terminal building, a control tower, an aircraft parking apron, a heating plant and an automobile parking lot. Before the construction of the new runway a five mile section of Chicago and Northwestern Railroad track was relocated to pass around the western boundary of the airport.

In March 1956, the City Council annexed O'Hare Airport and a highway corri-dor connecting it with the City proper. Simultaneously agreement was reached between City,

CHICAGO METROPOLITAN AREA EXPRESSWAY SYSTEM SERVING CHICAGO - O'HARE INTERNATIONAL AIRPORT

County and State to construct the Northwest Expressway, a free facility, from the Chicago Loop to the boundary of the airport. This expressway is currently under construction and is expected to be completed by mid 1960. It will connect with the tollway and expressway system serving the Metropolitan Area as shown in the accompanying map.

Airline traffic at O'Hare has increased steadily since it was opened. However, considering the increasing congestion at Midway Airport traffic at O'Hare has not been as heavy as was expected.

The reasons that the airlines have delayed in moving more of their operations to O'Hare are principally economic. The airlines have large investments in facilities at Midway and at present this airport is more accessible to the Chicago Loop. The airlines, therefore, have retained their principal flights at Midway and have been slow to develop an integrated pattern of interconnecting flights at O'Hare.

This situation, however, is certain to be reversed in the near future. The reason for this is clear: large turbo-jet aircraft can operate only at O'Hare in Chicago. The main trunk airlines beginning in 1956 have placed substantial orders for new large turbo-jet transports. Deliveries of these planes commenced in August 1958 and are scheduled for service in ever-increasing amounts beginning in January 1959. These aircraft cannot operate at Midway because of the limited runway lengths available and, since it is not economically feasible to extend runways in this built-up area of the City, these aircraft must use O'Hare Airport where the runways are longer.

Once the main turbo-jet flights are operating at O'Hare the feeder lines also must move substantial supporting schedules to interconnect with these main trunk line flights.

The change to be caused by the coming of turbo-jet aircraft became clearly apparent in 1957 and the airlines indicated a willingness to support a revenue bond issue which would finance the necessary development of O'Hare Airport for their use.

In March of 1957, the City appointed the architectural-engineering firm of Naess & Murphy to review previous plans for O'Hare development in view of changes in airline planning.

During the last eighteen months, the architects-engineers and their consultants, Landrum and Brown on airport planning and James P. O'Donnell on fuel storage and distribution, have carried foreward this study in close cooperation with the Bureau of Aviation of the City of Chicago, the Technical Development Center of the Civil Aeronautics Administration, and the Airline Technical Committee.

Early in the course of this study Landrum and Brown made a statistical analysis of the traffic to be expected at O'Hare through the year 1970. From these estimates preliminary forecasts were established for the facilities that would be required.

After extensive study the architects-engineers and their consultants concluded that the then existing master plan for O'Hare should be modified to better meet the conditions of jet age transportation.

PRELIMINARY CONCEPT OF O'HARE FIELD - MARCH 1958

Several different modified plans were prepared and discussed with the Airline Technical Committee and with City officials. In March 1958, agreement was reached on a new plan and formal approval was indicated to the City by the Airline Top Committee.

An artist's rendering of this plan depicting the airport at its ultimate stage of development is shown in the accompanying photograph. This plan has served as the basis for all of the subsequent planning which has followed and, except for minor changes, remains the basic plan for the airport.

Following the adoption of this new plan by the City and the airlines, attention was devoted to the matter of staging construction to best meet airline needs and financial capabilities.

Preliminary cost estimates of construction prepared in March, at the time the general plan was approved, were reviewed by the airlines with the architects-engineers. It was decided to defer some items until a later stage of construction and to reduce the scope of others in an effort to bring initial costs within acceptable limits.

Concurrently with these decisions the airlines took up the matter of allocating gate loading positions along the proposed concourse. It was necessary to resolve this matter before the airlines could determine their requirements for terminal building space and the architects could proceed with the development of the terminal building plans.

The gate allocations were decided by the Airline Top Committee in May and by the middle of June the architects-engineers had received space requirement

figures from most of the domestic airlines. At this point the architects-engineers began working with the airlines, either individually or in small related groups, in an effort to accommodate their requirements into plans for the buildings. This proved to be a difficult task because of considerable differences in requirements and in proposed methods of operation.

In addition to airline spaces which were closely tailored to airline needs, the architects-engineers reserved other spaces for concessions and the needs of the general public. These spaces were based on the recommendations of Landrum and Brown which were developed from their extensive study of concessions and concession revenues at other major airports.

Concurrently with this detail planning, the fuel consultant, James P. O'Donnell, prepared alternate systems for fuel storage and distribution. These were reviewed by the Airline Technical Committee and their recommendations were subsequently adopted by the Airline Top Committee.

By the end of September 1958, the major planning difficulties were resolved and the architects-engineers were able to prepare preliminary drafts of the airline lease exhibits and of the Engineering Report.

These were circulated to City officials, the Airline Technical Committee and the feasibility engineers for their final review during the first week in October. The Engineering Report presented herewith has been modified slightly to reflect final recommendations and space requirement requests.

II. GENERAL DESCRIPTION OF THE FIRST STAGE PROGRAM

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The first stage development program for O'Hare Airport is designed to provide Chicago with greatly expanded airport facilities which will accommodate the new commercial jet airliners and the expanded volumes of passengers which they are expected to carry.

Planning has been based on meeting needs for projected traffic as estimated by Landrum and Brown, airport consultants. The first stage development program has generally been based on meeting the traffic forecasts for the year 1965, at which time it is estimated there will be over five million passengers enplaned at O'Hare Airport.

TERMINAL AREA

Several different areas of the airport are scheduled either for expansion or entirely new development. The principal area of expansion will be the terminal area at the approximate center of the airport. An artist's rendering showing how this area will appear at the completion of first stage development is shown in the accompanying photograph. Additional sketches are also included which show close-up views of this area as well as some of the other areas scheduled to be developed.

It is planned to increase terminal facilities with the addition of two new unit terminal buildings with attendant concourses for parking aircraft. The present terminal building will be converted into an international arrivals and departure building with facilities for customs and immigration inspection.

CHICAGO – O'HARE INTERNATIONAL PROGRAM

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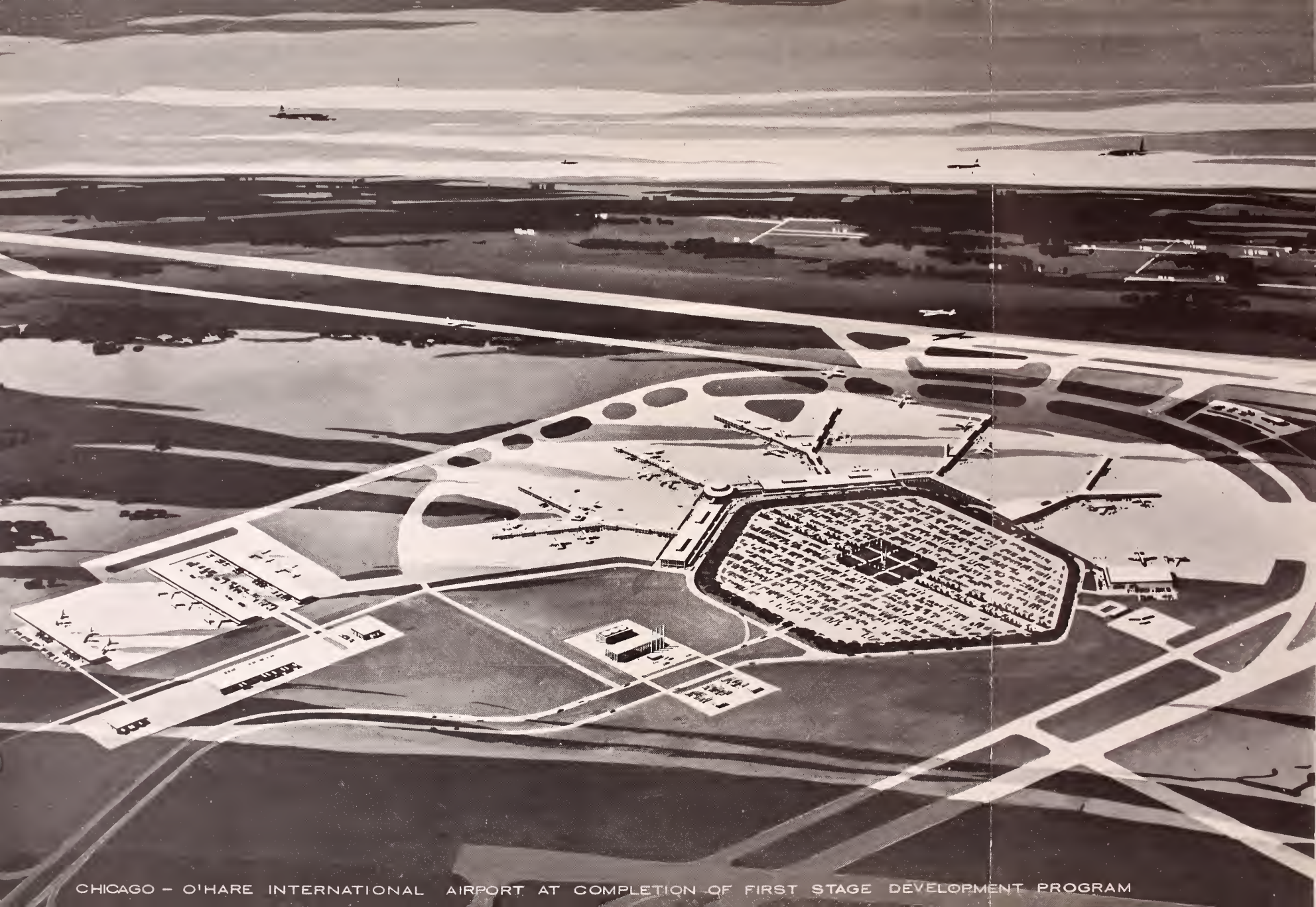


CHICAGO – O'HARE INTERNATIONAL AIRPORT AT COMPLETION OF FIRST STAGE DEVELOPMENT PROGRAM

The terminal buildings will have adequate space to accommodate the expected volumes of passengers without overcrowding. In addition to large areas being provided for the airlines and the public, there will also be corresponding provisions made for concessions which will serve the public and generate income for this project.

Areas assigned to airlines are based on their written requests for leased space. Areas assigned to concessions are based on the recommendations of Landrum and Brown, airport consultants. Both of these areas are delineated on the exhibits in the Appendix.

One of the principal concessions is the main restaurant which will be housed in a separate building connecting the two new unit terminals, and which will overlook the activity on the aircraft parking ramps.

The greatly expanded terminal area will be served by an elevated roadway which will separate the large volume of inbound and outbound ground vehicles which are expected to come from Chicago via the new Northwest Expressway which is scheduled for completion by mid-1960 and the Northern Illinois Tollways which are scheduled to be fully completed by January, 1959.

To accommodate the greatly increased number of automobiles expected, a large parking lot is planned for the center of the terminal area which will accommodate 5,700 automobiles.

On the apron side of the terminal area sufficient space is being provided along both sides of the passenger concourse to park over sixty aircraft. These aircraft parking positions will be served by an underground hydrant fueling system which will be designed to transport large volumes of jet fuel into the aircraft in a minimum time. Several of the airlines contemplate the installation of motorized loading bridges which

will enable passengers to be loaded and unloaded directly from second level departure rooms along the elevated concourses without interferring with operations on the parking apron.

In addition to greatly expanded facilities for the terminal area the first stage development program also calls for establishing new facilities in other areas. These include the hangar, cargo, tank farm and miscellaneous service areas.

HANGAR AREA

A large tract of land in the northwest section of the airport has been reserved for hangar facilities. Nine hangars are planned in the first stage with additional space available for other hangars in the future. Plans are also being made to extend sewer, water and power facilities into this area plus a taxiway and a service roadway. The entire area is to be graded and ditches provided to drain the area. Individual hangars will be provided with their own water reservoirs to afford adequate fire protection in the area without drawing on the main airport supply for emergencies.

CARGO AREA

A Cargo Area located east of the terminal area will provide joint cargo facilities for most of the domestic airlines plus the Railway Express Agency. Approximately 92,160 sq. ft. of joint cargo space will be provided with apron for parking ten aircraft. Additional separate facilities amounting to 36,000 square feet of warehouse and apron for parking six aircraft will be provided for an all-cargo air carrier.

Sites have also been reserved in the area for flight kitchens and a post office which are expected to be constructed by others during the first stage of construction.

Water, sewers, and roads, however, will be provided under the bond issue. The Public Service Co. Division of Commonwealth Edison Company will provide power facilities and gas facilities will be provided by either the Northern Illinois Gas Company or the Peoples Gas Light and Coke Company.

TANK FARM AREA

A tank farm area will be established in the northwest corner of the airport beyond the hangar area. Facilities will be provided at this location for unloading and storing fuel. These include facilities for receiving fuel by pipe line, railroad tank car and truck. The tank farm will be connected to satellite storage facilities located around the terminal apron and thence to the hydrants at the aircraft parking positions by a system of underground pipe lines.

SERVICE AREAS

The principal airport service facilities will be provided in three separate areas on the airport. A large new heating and refrigeration plant will be provided adjacent to the terminal area near the main entrance road. A fire station will be constructed in an area just beyond the terminal aircraft parking apron adjacent to the truck fill stand area. An airport maintenance building will be provided at the eastern end of the Cargo Area.

RUNWAYS, TAXIWAYS AND UTILTIES

In addition to these developed areas, provision is also being made to improve the present runway and taxiway system to accommodate jet traffic. Shoulders are

being added to some taxiways to protect outboard jet engines on the new jet aircraft. Taxiways and runways will be lengthened and strengthened with overlays as required. The airfield lighting system will also be improved.

Some of this work has already been completed or is currently under construction. Runway 9C-27C has been lengthened and overlayed. Runway 14R-32L is currently being lengthened and strengthened. It is scheduled to be returned to service in December, 1958.

The master plan for the airport also makes provision for future additional runways which will be built as required during later stages of airport development.

In addition to the above, the utility systems are to be greatly expanded. The overall drainage system for the airport is also to be improved and expanded in the first stage of construction.

Sites are also being provided for a large motel, an automobile service station and a parking area and service center for rent-a-cars. It is anticipated that these facilities will be built in the first stage, financed with private funds. Negotiations are planned by the City to this effect after the bonds have been sold.

A list of the major items of airport construction to be undertaken in the first stage, together with a general description, outline specification and cost estimate for each, follows in the next section of this report.

III. LIST OF FIRST STAGE CONSTRUCTION PROJECTS

a. Description
b. Outline Specification
c. Cost Estimate

A. RUNWAYS AND TAXIWAYS:

1. Taxiways Serving the Cargo Area

a. Description: A system of taxiways will be provided to serve the Cargo Area. The principal taxiway of this sytem is an east - west extension of the outer circular taxiway from the point where it completes a circuit of the Terminal Area apron. This taxiway passes along the south side of the Cargo Area and connects to two north - south taxiways which merge with the aircraft parking aprons serving the two joint airline cargo buildings. The easternmost of these two taxiways will also serve the area allotted to The Flying Tiger Line for a cargo facility.

A short taxiway connecting the westernmost of the two north - south taxiways with the Terminal Area apron completes the Cargo Area taxiway system.

b. Outline Specification: Taxiways will be constructed of concrete 15" thick and 75 feet wide on compacted granular sub-base. Total design thickness shall be sufficient to support 100,000 pound single wheel loads according to C.A.A. standards for soil conditions encountered. Taxiway grades shall not exceed 1-1/2%. Stabilized shoulders of 3" of bituminous concrete on compacted granular sub-base shall be installed on both sides of the taxiway except on the side where the taxiway merges with the cargo aprons. These shoulders shall be 25 feet wide and shall be designed to

support 12,000 pound wheel loads. Perimeter taxiway lighting shall also be installed on both sides of the taxiways, except where the taxiway merges with the cargo apron.

c. Cost Estimate $ 986,000.

2. Improvements to Runway 14R-32L

a. Description: In September of 1958 the City of Chicago awarded contracts for certain improvements and extensions to existing Runway 14R-32L. These improvements include an extension of the parallel taxiway to the northwest end of the runway, a warm-up pad at both ends of the runway, an extension of the runway at the southeast end to make a total runway length of 8,838 feet, an overlay of the runway with concrete to strengthen it for jet traffic and new runway lighting. This work is being financed from funds already appropriated by the City of Chicago, State of Illinois and the United States Government. This work is scheduled for completion by December 15, 1958.

Certain of the new lighting work, however, is ineligible for Federal or State aid and must be included in the bond issue financing. This amount is estimated to be $83,000.

In addition another improvement is considered essential for safety. This involves elimination of the drainage ditch for 250 feet on either side of the runway at the northwest end. It is proposed to remedy this situation by filling the ditch for 500 feet and carry the drainage water under-

ground in pipes. This is estimated to cost $250,000.

b. Cost Estimate $ 333,000.

3. Taxiway to Hangar Area:

a. Description: A taxiway is planned which will provide airplane access to the lots in the Hangar Area. This taxiway will start at the existing taxiway along the southeast edge of the Hangar Area and extend through the center of this area and connect to the parallel taxiway to Runway 14R-32L.

b. Outline Specification: (See taxiway specification under Item A-1 above)

c. Cost Estimate $ 1,492,000.

4. New Outer Circular Taxiway and Connecting Taxiways Around the Terminal Complex:

a. Description: It is planned to extend the present outer circular taxiway around the new terminal area parking apron. This taxiway will connect to the terminal apron with short connecting taxiways at regular intervals and will also connect to a new taxiway serving the Cargo Area. The outer edge of the terminal apron will serve aircraft taxiing in one direction and the outer taxiway will carry traffic in the opposite direction.

b. Outline Specification: (See taxiway specification under Item A-1 above)

c. Cost Estimate $ 1,467,000.

5. Shoulder Stabilization on Some Existing Taxiways:

a. Description: On taxiways 75' wide the outboard engines of the new large

jet aircraft will be beyond the edge of the taxiway pavement. To minimize ingestion of foreign material into these engines and also to reduce erosion along the sides of the taxiways, it is considered essential to install 25' wide shoulders stabilized with bituminous concrete on both sides of taxiways to be used by jets.

It is proposed to construct these shoulders on the westernmost section of the parallel taxiway to Runway 9C-27C and on the existing portion of the outer circular taxiway.

It will also be necessary to rework the perimeter lighting system on these taxiways to permit the shoulder installation.

b. Outline Specification: Remove existing unclassified material to depth required. Install new granular and water bound macadam sub-base and 3" bituminous concrete wearing surface. Total thickness to be designed to support 12,000 pound single wheel loads. Rework taxiway lights.

c. Cost Estimate $ 267,000.

6. Blast Fence at Warm-Up Pad near the Northwest End of Runway 14L-32R:

a. Description: To protect the hangar area road and hangar development adjacent to the warm-up pad from jet blasts, it is planned to install a blast fence which will deflect these blasts.

b. Outline Specification: The blast fence will be constructed of precast concrete panels installed at an angle of approximately 60° with the ground and supported by precast concrete "A" frame.

c. Cost Estimate $ 7,000.

B. UTILITIES:

1. New Water Main from Chicago:

a. Description: O'Hare Airport will require a 30" water main. The Bureau of Water, Water Distribution Division of the City of Chicago will build a 36" water main from Bryn Mawr Avenue and Canfield Road to inside the property and contribute the difference in cost between 30" and 36" water main.

Near the east boundary of the airport a Meter and Chlorine House will be constructed. The water will become the property of the Bureau of Aviation of the City of Chicago at this point and it will be chlorinated by this department.

Water main will be extended into the Terminal Area Reservoir and around the Terminal Area for fire protection.

b. Outline Specification:

1.	Water Main	Prestressed Concrete Cylinder Pipe
2.	Valves	Chicago Standard Valves
3.	Valve Basins	Chicago Standard
4.	Meter & Chlorine House	Face brick, 20' x 25', one story and basement
5.	Meter	Sparling indicating, totalizing recording and batching meter
6.	Chlorinator	Chicago Standard
7.	Fire Hydrants	Chicago Standard

c. Cost Estimate $1,840,000.

2. Hangar Area Water Main:

a. Description: Water supply from the Terminal Area will be through a 16"

main and loop around the Hangar Area with an internal loop for the interior lots and a branch connection to the Tank Farm Area. Fire hydrants will be provided where required.

b. Outline Specification:

1.	Water Main	Prestressed concrete cylinder pipe or 250# mechanical joint cast iron water main.
2.	Valves	Chicago Standard
3.	Valve Basins	Chicago Standard
4.	Fire Hydrants	Chicago Standard

c. Cost Estimate $ 596,000.

3. Terminal Area Water Reservoir:

a. Description: Adjacent to the Heating Plant an additional water reservoir will be built. Fill connections and booster pumps will be inside Heating Plant. Automatic program pressure controls will operate system which will be connected to all buildings in the Terminal Area by a cold water main in the Utility Tunnel. Cased meters will be provided for each carrier or other tenant having special water requirements.

b. Outline Specification:

1.	Reservoir	Reinforced concrete. Design to meet City of Chicago and State of Illinois sanitation standards.
2.	Pumps	Horizontal Split case or vertical immersed pumps, automatic program controlled.
3.	Water Main	250# mechanical joint cast iron water main
4.	Meters	Chicago approved.

c. Cost Estimate $ 711,000.

4. Sanitary Sewers:

   a. Description: Sanitary sewer shall loop Hangar Area and connect to main sewer east of Terminal Area.

   b. Outline Specification:

1.	Pipe	Extra heavy vitrified clay tile
2.	Manholes	Precast concrete ring or block with City standard covers, frames and steps.

   c. Cost Estimate $ 605,000.

5. Storm Drainage Improvements, Alterations and Extensions for the Airport:

   a. Description: The airport area is presently served by two drainage outlets. One is to the north across Higgins Road and the other is to the southeast across Mannheim Road. Both outlets eventually empty into the DesPlaines River.

   In general, it is proposed to carry storm water to the edge of paved areas in underground pipe, and thence to the main drainage channels in open ditches. The drainage system will be designed to control the rapid run-off from the large paved areas so that it will leave the airport at a pre-determined rate which will not innundate the populated areas beyond the airport. To accomplish this result it will be necessary to provide ponding areas where a heavy rainfall can be impounded and allowed to drain off gradually through existing channels beyond the airport.

   b. Outline Specification: Pipe will be corrugated metal and concrete. Branch ditches will have slopes of not greater than 5 to 1 and will be

seeded. Main channels will have small pilot channels in the center. Main channels will be seeded. Head walls will be reinforced concrete.

c. Cost Estimate $ 942,000.

6. Cargo Area Utilities:

a. Description: Cold water main shall be a branch connection from the Utility Tunnel Main. Fire protection shall be a branch main from city water main loop. Sanitary sewer shall connect to main sewer east of Terminal Area.

b. Outline Specification:

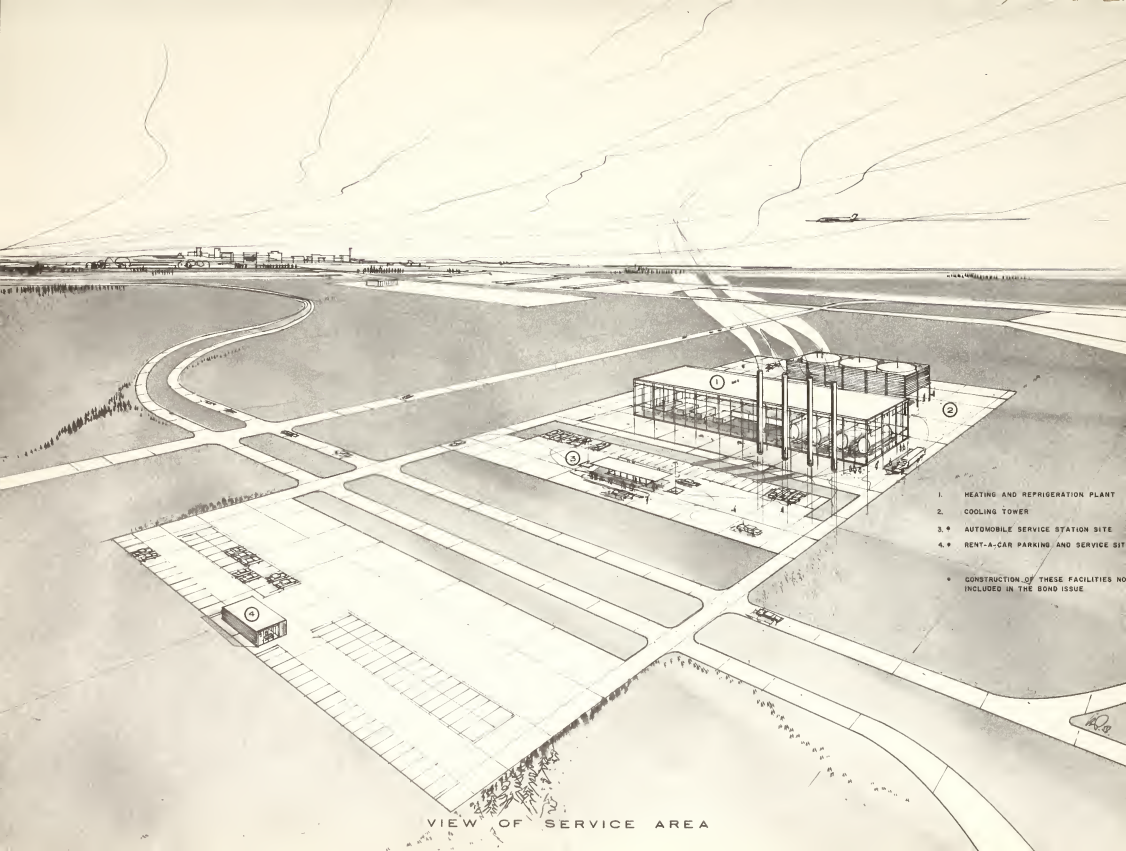
1.	Water Main	250# mechanical joint cast iron water main
2.	Valves & Hydrants	Chicago Standard
3.	Sanitary Sewer	Extra heavy vitrified clay tile
4.	Manholes	Precast concrete ring or block with City standard covers, frames and steps

c. Cost Estimate $ 208,000.

7. New Heating and Air Conditioning Plant:

Air Conditioning:

a. Description: Refrigeration machines will furnish chilled water through an underground tunnel system to each terminal building, each concourse and to restaurant area. The chilled water will be looped so that additional buildings may be connected at a future date. Condenser water will be cooled by induced draft cooling tower located on the ground adjacent to the boiler plant.


1. HEATING AND REFRIGERATION PLANT
2. COOLING TOWER
3. * AUTOMOBILE SERVICE STATION SITE
4. * RENT-A-CAR PARKING AND SERVICE SIT
* CONSTRUCTION OF THESE FACILITIES NO
INCLUDED IN THE BOND ISSUE

VIEW OF SERVICE AREA

b. Outline Specification:

Refrigeration Machines: Electric motor or steam turbine driven centrifugal compressors or steam absorption units.

Cooling Towers: Induced draft type, transite enclosed cooling tower with redwood fill and steel basin and supporting structure. Tower to be supported on elevated grid 6'-0" or more above grade level.

Pumps: Chilled water and condenser water pumps shall be horizontally split cased, double suction, motor driven pumps.

Piping: All chilled and condenser water piping shall be schedule 40 black steel pipe with welded fittings.

Insulation: All chilled water piping shall be insulated with 1-1/2" glass fiber insulation with vapor barrier jacket.

Heating:

a. Description: Steam boilers with integral water cooled furnaces will furnish 125 p.s.i. steam through the underground tunnel system to all of the buildings in the Terminal Area. Steam and condensate piping will be looped and boiler plant auxiliaries will include feed water treatment and pumps, condensate receiver and feed water heater, oil and gas burners, complete integrated control panel, fuel oil storage, forced draft fans, and smoke stacks.

b. Outline Specification:

Boilers: Four integral furnace boilers.

Burners: Steam atomizing #6 oil burners and gas burners complete with oil pumping and heating set and 150,000 gals. oil storage.

Feed Water Heater: Tray type deaerating heater for returns and make-up water.

Heavy duty centrifugal feed water pumps.

Chemical Feed Water treatment for scale prevention, oxygen scavenging and return line corrosion.

Building:

a. Description: The heating and air conditioning plant building will be one story and partial basement containing approximately 25,000 sq. ft. of floor space. The building will be located in the service area adjacent to the cooling tower and the new water reservoirs. Utility tunnels will connect between the terminal area buildings and this building.

b. Outline Specification:

Structure: Steel frame, concrete foundations, basement and floor. Steel roof deck.

Exterior: Face brick, aluminum sash, hollow metal doors and frames.

Interior: Concrete floor, concrete block walls, exposed ceiling construction, hollow metal doors and frames.

Tunnels: Reinforced concrete.

c. Cost Estimate $4,530,000.

8. Fueling System:

a. Description: In general the fueling system will consist of a primary bulk storage area, known as the Tank Farm Area, located in the northwest corner of the airport, satellite storage areas located around the periphery of the terminal apron, and underground apron fueling systems which will terminate in hydrants at individual aircraft parking positions.

Transfer of fuel from bulk to satellite will be by means of eight underground pipe lines assigned to suppliers. Each of these lines terminate in a manifold at the Truck Fill Stand Area which is located near the northwest corner of the terminal apron. From this point individual airline-product lines, which also connect to the manifold, will extend to the satellite storage areas beyond. One transfer line will be assigned to each of BNF, CAL, CAP and NOR. Two lines each will be assigned to AAL, DAL, NWA, TWA, UAL and EAL.

Turbine and 115 octane Avgas are stored in the bulk tank farm. 110 octane Avgas, however, is stored at the Truck Fill Stand Area and will be supplied only by truck. Transfer of 100 octane Avgas to aircraft will also be by truck only.

Allowance is made for as many as five suppliers of turbine fuel and three 115 octane Avgas suppliers if each supplies about the same quantity.

Four suppliers of 100 octane can be accommodated.

Bulk Storage Area: Above ground tanks will be provided which will store three days supply of turbine and 115 octane fuel based on 1965 anticipated demand. Facilities, including railroad sidings, will be provided for tank filling by railroad tank cars and trucks. Facilities will also be provided to permit connections for supply from commercial pipe lines.

Satellite Storage Areas: Underground tanks in the satellite areas will store one day's supply of turbine and 115 Avgas as required by each airline, except that any airline requirement for less than 10,000 gallons per day will be satisfied by truck refueler drawing directly from bulk storage through the manifold at the Truck Fill Stand Area.

Apron Fueling System: Six airlines, AAL, EAL, DAL, NWA, TWA and UAL will have two apron systems each. These can be used for two grades of fuel. CAP, BNF, CAL and NOR will each have a single apron system. Piping will be extended, however, so that airlines which do not require sufficient amounts of fuel to have a complete separate underground apron system, may, by adding hydrant valves and other mechanical equipment, purchase fuel through a major fuel user located on their finger.

In addition to the above, an apron system with two hydrants will also be furnished to The Flying Tiger Lines' apron in the Cargo Area.

b. Outline Specification:

Primary Storage Tanks: Above ground floating roof tanks of 500,000, 350,000 and 168,000 gallons capacity for turbine fuel and for 150 octane fuel at the Bulk Tank Farm Area. Tanks will be steel welded construction in accordance with A.P.I. standard 12C. 50,000 gallon horizontal cylindrical tanks for 100 octane fuel at the Truck Fill Stand Area.

Satellite Tanks: Horizontal cylindrical steel tanks of 50,000 and 25,000 gallons capacity, underground or under an earth mound. Steel plates to be A.S.T.M. A-285 - Grade C.

Pumps: Horizontal centrifugal pumps with explosion-proof motors at the primary storage area and truck fuel stands. Vertical turbine type pumps with explosion-proof motors will be mounted near the satellite tanks.

Filter Separators: Units of the latest design to satisfy Corp of Engineers specification Military - F-8508a for filtering and water removal. The equipment will include all necessary instruments for automatic water drain and slug control.

Piping Valves and Fitting: All material to be in accordance with appropriate local, A.S.M.E. and A.S.T.M. or other applicable codes and with the best refinery and pipe line practice. All underground

pipe shall have a protective coating in accordance with A.W.W.A. standard specification C-203-57. All underground lines will be cathodically protected where required in accordance with modern piping lines practice and applicable specifications.

Electrical: Transformer will be provided at the primary and satellite areas with standard N.E.M.A. - E.E.I. accessories including liquid level and temperature indication and alarm, as well as sudden pressure relaying for short circuit and reverse current protection. Secondary disconnecting protection will be provided.

Switch-gear will be of standard manufacture and size to meet the connected load. All equipment shall be installed on prefabricated explosion-proof racks.

Local controls such as lighting panels, push buttons, switches, etc. shall be standard equipment rated for that particular service and contained in expolsion-proof housing.

Wiring will conform to Chicago and National electric code the requirements for Class 1, Division F, Group D and environment.

Instruments: Instrumentation will be provided for automatic filling of satellite tanks and automatic sequencing of satellite pumps to provide the peak flow required at the terminal fueling position.

Fire Protection: The primary storage area will be protected by the net-

work of foam piping and cooling water piping directly supplied through the airport fire system. The satellite area protection will consist of generators which will be connected to the apron fire water hydrants when required.

Control House will have a graphic panel which will indicate the levels of all tanks. Running lights will indicate which equipment is in operation.

c. Cost Estimate: $5,413,000.

C. TERMINAL AREA

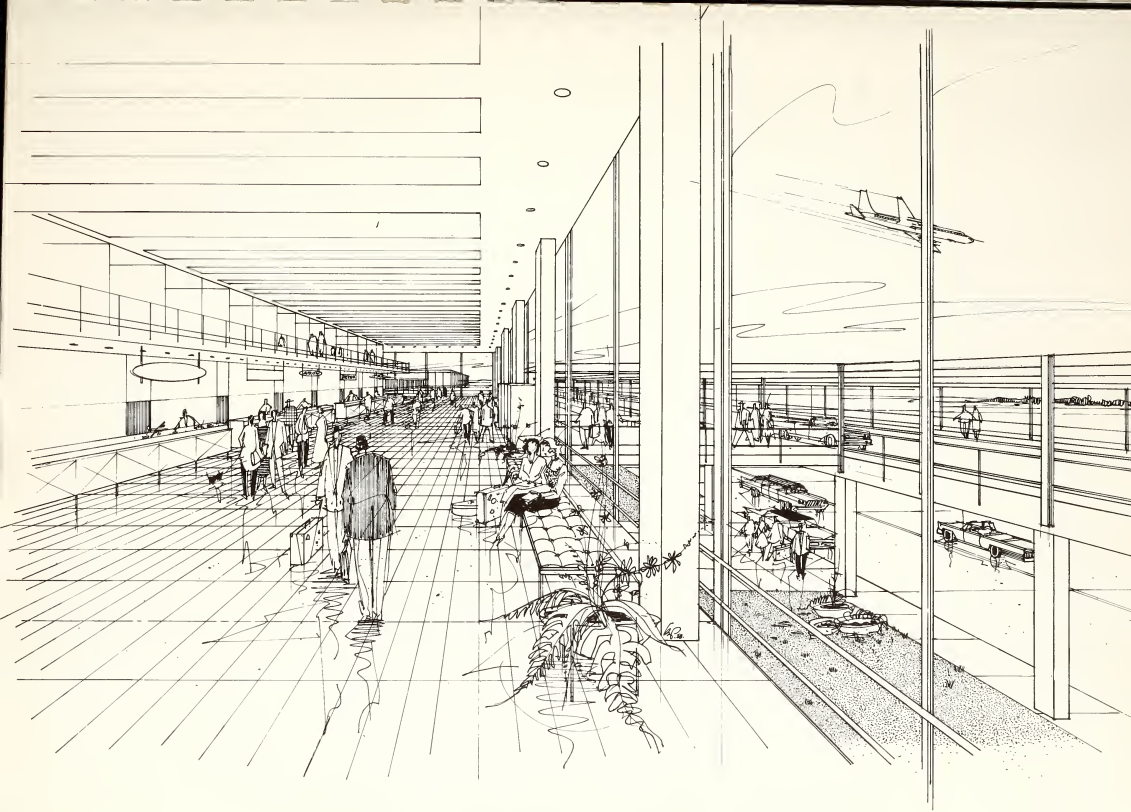
1. New Terminal Buildings Concourses and Restaurant Building

Terminal Buildings:

a. Description: The two new terminal buildings, "D" and "F", will be rectangular buildings, approximately 140 feet wide by 750 feet long, consisting of two full floors, a mezzanine floor, and a partial basement.

General separation of inbound and outbound passengers is obtained by concentrating items relating to each on separate floors. The outbound passenger will arrive at the terminal building at the second floor via an elevated roadway. He may proceed by the ticket counters to the airplane without leaving this level. The inbound passenger also will come from the airplane at the second level, but will descend to the first floor via escalators to claim his baggage and obtain ground transportation from the terminal.

Consequently the first floor is devoted largely to baggage handling areas and to concessions related to inbound passengers such as rent-a-car agencies, hotel reservations, limousine and taxi offices, telegraph counters, etc. The second floor is devoted largely to airline ticket counters, offices, waiting areas and general concessions such as newsstands, lunch counters, insurance counters, and general merchandise stores.



VIEW OF TICKET LOBBY IN TERMINAL BUILDING F

The mezzanine floor will accommodate additional airline offices, rental offices, airline clubs, and airport administrative offices. Rental space will also be available for one or more chapels. A partial basement and service tunnel will provide storage space, transformer vaults and meter rooms and other areas for mechanical equipment. Fan rooms to ventilate the buildings will be located on the roof. Chilled water and steam for air conditioning and heating will come from a central plant located in the service area. All areas except baggage handling, storage, and mechanical equipment areas will be air conditioned. A public address system will be provided and also conduit for other airline communication requirements.

b. Outline Specification:

Structure: Fireproofed steel frame or reinforced concrete frame. Reinforced concrete foundation, basement and service tunnels.

Exterior:

1st floor: Precast concrete panels with exposed granite aggregates, brick or cut stone, plate glass at the exit vestibules. Aluminum and glass doors.

2nd floor and mezzanine: Fixed heat-absorbing plate glass supported by a system of extruded aluminum mullions.

Penthouses: Steel frame with aluminum louvers and insulated aluminum panels.

Interior:

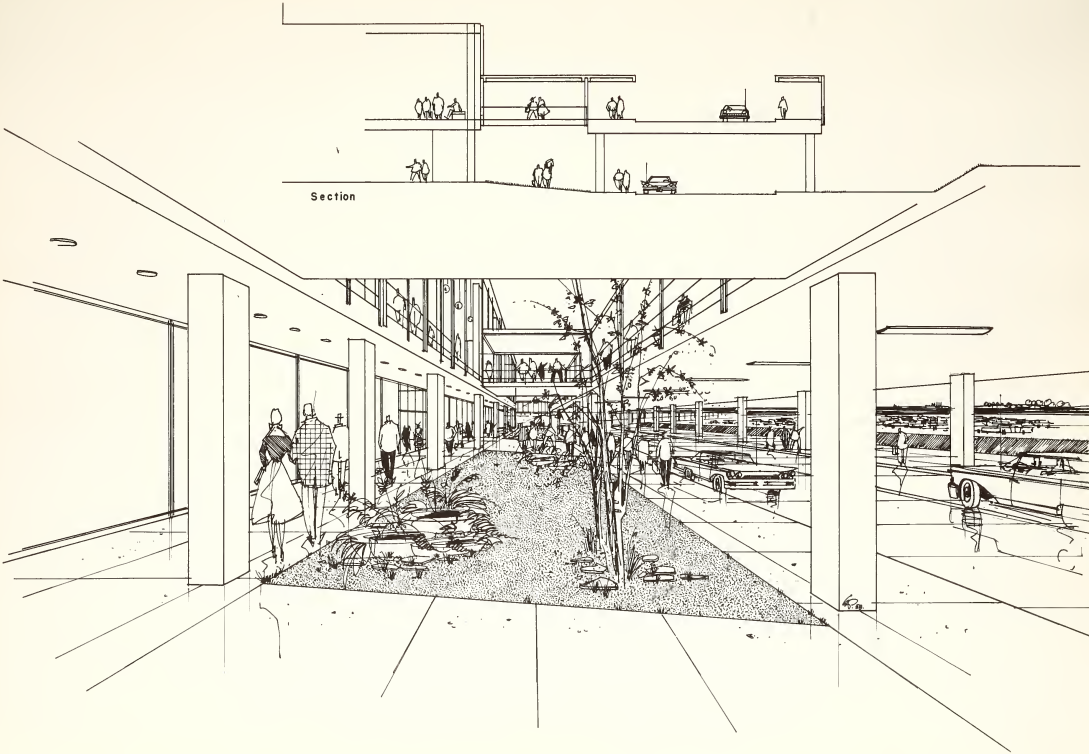
Baggage Area, Mechanical Equipment Rooms: Concrete floor, exposed wall and ceiling construction, industrial type fluorescent lighting, motor operated overhead doors.

Public Lobby Area: Terrazzo floor, structural glazed tile, plaster and plastic faced fabric walls, metal panel acoustical ceilings, recessed fluorescent and incandescent lights. Waiting room chairs, benches, desks and signs.

Toilets: Ceramic tile floors and walls, plaster ceiling, recessed fluorescent lights, flush metal toilet partitions, wall hung lavatories and toilets, plate glass mirrors and incidental furnishings such as waste receptacles, hand driers, soap dispensers, etc.

Airline Spaces: "D" color asphalt tile floors, (except terrazzo floor in claim baggage area) plaster on perimeter walls, (except glazed structural tile in claim baggage area), metal panel acoustical tile ceilings, recessed fluorescent light fixtures, air conditioning outlets and high and low tension underfloor ducts at standard spacings. Ticket counter shells of plastic surfaced wood with metal frames. Ticket counter inserts, interior partitions, baggage conveyors and furnishings shall be by the individual airline tenant.

Enclosed Concessions: Terrazzo floor, plaster and glass perimeter walls, metal acoustical tile ceiling, recessed fluorescent lights and air conditioning outlets on standard spacings.


Section

Necessary utilities (water, waste and electrical) stubbed into the space. Uniform aluminum and glass entrances. Interior partitions, and all furnishings by tenant.

Open Concessions: Counters, stands, signs, etc. to conform to an approved building standard shall be provided in the public space by the tenant. Access to required utilities shall be furnished to the tenant.

New Concourse Buildings:

a. Description: There will be a total of four concourses projecting from the two terminal buildings. Two of these, C and E will be straight and two, D and F, will be so-called split "Y" units. They will consist of an elevated passenger corridor 20 feet wide with small passenger waiting lobbies or "hold" rooms on either side of the corridor at each airplane "gate" position. This level corresponds to the second floor of the terminal building.

Under the passenger corridor and hold rooms at the level of the airplane apron will be airline operations rooms and hold rooms for some carriers who prefer not to load passengers from the second level with loading bridges. Between these units there will be open areas for the passage and shelter of airline ramp service equipment.

In the center of the split "Y' concourses will be two floors of additional airline operations spaces with an additional enclosed observation area on the roof which will overlook an open observation deck.

Fan rooms for ventilation equipment will be provided in penthouses on the roofs.

A service tunnel will run beneath the concourses to provide for distribution of utilities including primary power lines to which the airline tenants may connect to obtain ground power for aircraft and motor operated loading bridges.

b. Outline Specification:

Structure: Reinforced concrete frame.

Exterior:

1st floor: Precast concrete panels with exposed aggregate or face brick, aluminum windows.

2nd floor: Similar to 1st floor along public corridors, but fixed heat-absorbing plate glass in aluminum frames at hold rooms.

Penthouses: Steel frame with aluminum louvers and panels.

Interior:

Public Corridors: Terrazzo floors, metal acoustical panel ceiling, recessed fluorescent lights. Corridors shall be air conditioned.

Hold Rooms: Same as for corridors, except walls to be heat-absorbing plate glass. All furnishings shall be by individual tenant airline. Loading bridges shall be by the tenant. Hold Rooms shall be air conditioned.

Operations Areas: Ground equipment rooms shall be generally left unfinished except for industrial type fluorescent lighting and heat. Other operations areas, floors to be asphalt tile, perimeter walls plaster, metal panel acoustical ceiling, recessed fluorescent lights and air conditioning outlets and high and low tension underfloor ducts on standard spacings.

Interior partitions and furnishings will be by airline tenants.

Observation Deck: Penthouse will be steel frame structure, with plate glass walls. Floor will be terrazzo and ceiling will be metal acoustical tile. The open observation area will be asphalt promenade tile over a membrane roofing. Railings will be of steel or aluminum.

New Restaurant Building:

a. Description: The restaurant building will be a large circular unit located at the base of concourse E between terminal buildings D and F. It will be connected to the latter on the second level by enclosed elevated passages. The basement and first floor will be devoted to mechanical equipment, storage and an employees' cafeteria. The second floor will have a large coffee shop and kitchen and the third floor will have a cocktail lounge, dining room and main kitchen. (Note: Lunch counters and liquor bars for quick service are also to be located in both terminal buildings and in the split "Y" concourses D and F.)

b. Outline Specification:

Structure: Fireproofed steel or reinforced concrete frame with cellular steel or concrete floors.

Exterior:

1st floor: Precast concrete panels with exposed granite aggregate or face brick.

2nd and 3rd floors: Fixed heat-absorbing plate glass in extruded aluminum frame.

Interior:

Public Corridors: Terrazzo floors, structural glazed tile or plastic coated fabric, plaster and glass walls, suspended metal lath and acoustical plaster ceiling with recessed fluorescent lights.

Storage Areas: Generally unfinished except for industrial type lighting.

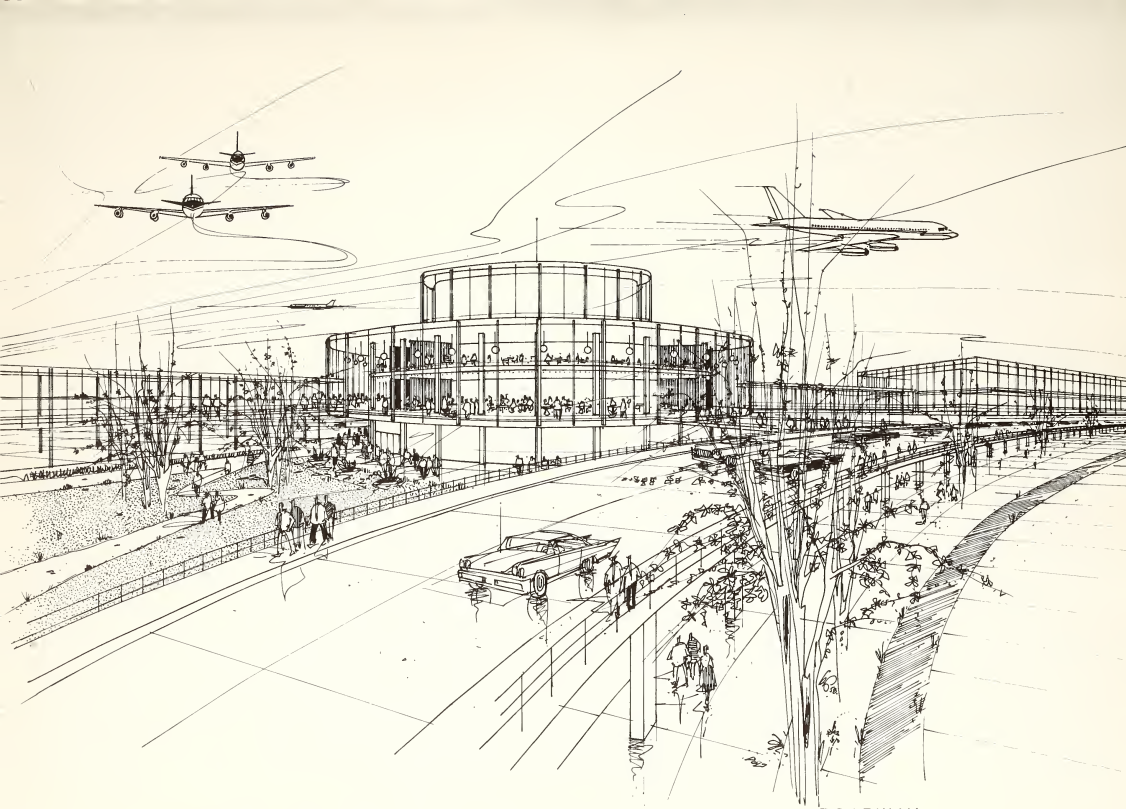
Kitchens: Quarry tile floor, structural glazed tile perimeter walls, plaster ceiling with recessed fluorescent light fixtures. All kitchen equipment, including walk-in refrigerators and interior partitions shall be furnished by the tenant.

Cafeteria, Coffee Shop, Dining Room and Cocktail Lounge: All interior finishes shall be furnished by the tenant.

c. Cost Estimate (Terminals, Concourses, and Restaurant) $ 23,500,000.

2. New Apron Paving:

a. Description: The new apron pavement will serve to park aircraft at new concourses C, D, E and F. The apron is designed to be wide enough to permit two-way traffic of aircraft to and from concourse parking positions and one-way at the perimeter.



VIEW OF RESTAURANT BUILDING FROM ELEVATED ROADWAY

b. Outline Specification: Apron pavement shall be concrete on a granular sub-base. Concrete shall be 15" thick designed to support single wheel loads of 100,000 lbs. in all areas accessible to aircraft. In general, apron areas within 50 feet of the concourses and in open spaces under the concourses where aircraft loads will not be imposed shall be 8" thick. An exception to this occurs at certain gate positions on concourse F where Delta and American plan to nose-in the aircraft. At these locations strips of 15" concrete shall extend to the concourse building.

Grounding connections at each aircraft parking position and a small pit for electrical equipment together with empty conduit to the tunnel at requested positions will be provided. Wiring to tunnel and electrical equipment shall be by airline tenants.

At the periphery of the apron there will be a 25 foot wide strip of stabilized shoulder consisting of 3" of bituminous concrete on a granular sub-base. The apron edge will be lighted with perimeter lighting.

A blast fence will be provided to protect the service roadway at the first two aircraft parking positions at concourse "D". Blast fences between aircraft parking positions, if required, shall be by airline tenants.

c. Cost Estimate $ 9,014,000.

3. Main Entrance Roadway:

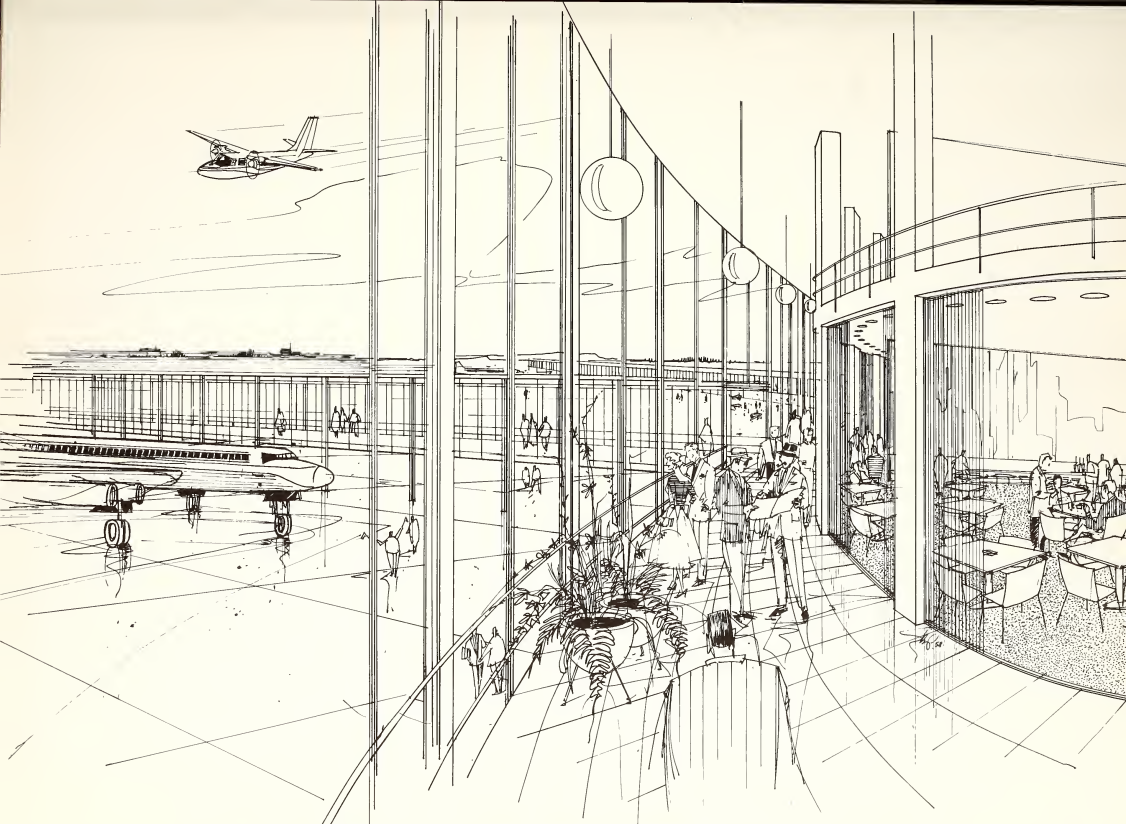
a. Description: The present 4 lane divided entrance roadway will be altered to meet new conditions and an elevated roadway will be added to serve

the new terminal buildings. The terminal end of the present road will be revised to allow for a greatly expanded parking area and to accommodate changes necessitated by the elevated roadway. The incoming lanes will circle the parking lot counter-clockwise, will rise on the elevated section of the roadway passing by the passenger discharge points at the upper level along the front of the terminal buildings, and will descend to grade level completing the circle around the parking lot. They will then leave the airport with lanes parallel to the entrance lanes. Another section of the roadway will pass under the elevated roadway passing by the passenger pick up points at the lower level along the face of the terminal buildings. Both sides of the entrance roadway will be fenced.

b. Outline Specification:

Grade Level Roadway: Will be constructed of 3" of bituminous concrete on 10" of water bound macadam and 6" of granular sub-base Where the roadway circles the parking lot there will be concrete curbs and gutters. Balance of the roadway will have compacted granular shoulders. Lighting standards to be of aluminum. Lighting to be color-corrected mercury vapor.

Elevated Roadway: Structure will be steel or reinforced concrete supported on reinforced concrete foundations. Roadway bed, curbs and sidewalks will be reinforced concrete. Roadway surface shall be bituminous concrete.



VIEW FROM RESTAURANT BUILDING OVERLOOKING AIRCRAFT APRON

Canopies over sidewalks at passenger discharge locations will be steel. Guard railings will also be of steel. Lighting standards will be of aluminum. Lighting to be color-corrected mercury vapor lights.

Fencing: 7 foot high galvanized chain-link fence with 3-strand barbed wire guard.

c. Cost Estimate $1,166,000.

4. Alterations and Additions to the Parking Lot

a. Description: Parking for 5,750 automobiles will be provided in the large lot in center of the terminal complex. It is expected that 100 of these spaces immediately adjacent to the terminal buildings will be reserved for rent-a-car parking (balance of rent-a-car parking is to be provided by the rent-a-car concessionaires on the site reserved for this purpose elsewhere on the airport). It is also expected that 900 spaces in the more remote areas of the lot will be reserved for employee parking. The balance of 4,750 spaces will be reserved for passenger and visitor parking. This corresponds to Landrum and Brown's forecasted requirement for 4,750 paid parking positions in 1962.

Landrum and Brown also have forecasted a requirement for 2,200 employee parking spaces being provided in the terminal area 136 spaces will be provided in the joint airline cargo area, 20 at the fire station, 25 at the boiler plant and 30 at the airport maintenance building. Costs of these parking

spaces are included under other sections of the cost estimate. Additional employee parking spaces will be provided in the Hangar Area and are included in the separate cost estimates for these facilities.

Other parking spaces are expected to be provided by others in connection with the post office, flight kitchens and motel, but these are not included in the cost estimates to be financed by the revenue bond issue.

b. Outline Specification: Curbs, gutters and sidewalks will be of concrete; parking pavement will be 3" bituminous concrete on 10" water bound macadam and 6" granular sub-base; parking stalls will be 9 feet wide marked off with painted lines; light standards are to be aluminum and lighting is to be color-corrected mercury vapor lighting. Two attendant houses will be steel and glass with steel canopies.

c. Cost Estimate $1,610,000.

5. Landscaping:

a. Description: An allowance will be included in the cost estimates for landscaping of the entrance road, and the parking lot. This allowance includes seeding of both sides of the entrance roadway and the median strip from Mannheim Road to the parking lot; seeding and planting of trees and shrubs in the parkway areas between the entrance road loop and the parking lot; seeding and planting of trees and shrubs along the

radial pedestrian walkways from the center of the parking lot to the terminal buildings, and constructing a pool with water jets at the center of the parking lot.

b. Outline Specification: Seeded areas shall be graded to specified lines and grades and shall have a minimum of 6" of top soil rolled, scarified, fertilized and seeded with a specified seed mixture. Planted areas shall be planted with deciduous and broad-leaf evergreen shrubs and ground cover and with deciduous trees of 4" maximum caliper.

c. Allowance $ 500,000.

6. Apron Paving at Existing Split Finger B

a. Description: It is proposed to pave the balance of the area at existing split finger "B" in order to provide additional airplane parking positions during the two years that the new terminal facilities will be under construction.

b. Outline Specification: Pavement for a strip 50 feet wide adjacent to the concourse building will be 8" thick concrete. Balance of area will be 15" thick concrete. Both pavements shall be installed on compacted granular sub-base.

c. Cost Estimate $ 410,000.

7. Alterations to Existing Terminal "B" and Concourse "B"

a. Description: It is planned to provide space for the international air carriers and space for customs and immigration inspection in the present Terminal Building "B", after it has been vacated by the present domestic airlines. These airlines are scheduled to move into the new Terminal Buildings "D" and "F" by 1961. At this time, it is proposed to alter Terminal "B" to provide approximately 20,000 sq. ft. of space on the 1st floor for customs and immigration inspection. Approximately 8,000 sq. ft. of rentable outbound baggage space will also be provided on this floor, plus storage, service and mechanical areas.

The second floor will also be revised and refurbished. Approximately 8,000 sq. ft. of ticket counter and airline office space will be available on this floor for rent to the airlines. Additional space will be provided for concessions, public waiting and public toilets.

It is also planned to remodel about one half of Finger "B", removing the present temporary operation quarters from the area, enclosing the existing concrete structure and providing approximately 6,000 sq. ft. of rentable operations space. Existing concrete ramps in the area of the existing structure will be removed and a new roof slab installed.

b. Outline Specification: Where necessary to alter or extend the present structure the new work will be reinforced concrete similar to the present

structure. Exterior finishes shall match the existing materials except that the present temporary cement asbestos enclosure at the front of the building will be replaced with fixed heat absorbing plate glass and aluminum mullions. Interior finishes in general shall match existing finishes.

c. Allowance $ 1,520,000.

D. HANGAR AREA:

1. Railroad Connection:

a. Description: Before certain lots in the hangar area can be used, it will be necessary to remove a section of railroad spur and provide a new short connecting link of track providing a direct link between the incoming spur from the west and the line leading into the military reservation at the northeast corner of the airport. The removal work will be handled as part of the overall grading of the hangar area.

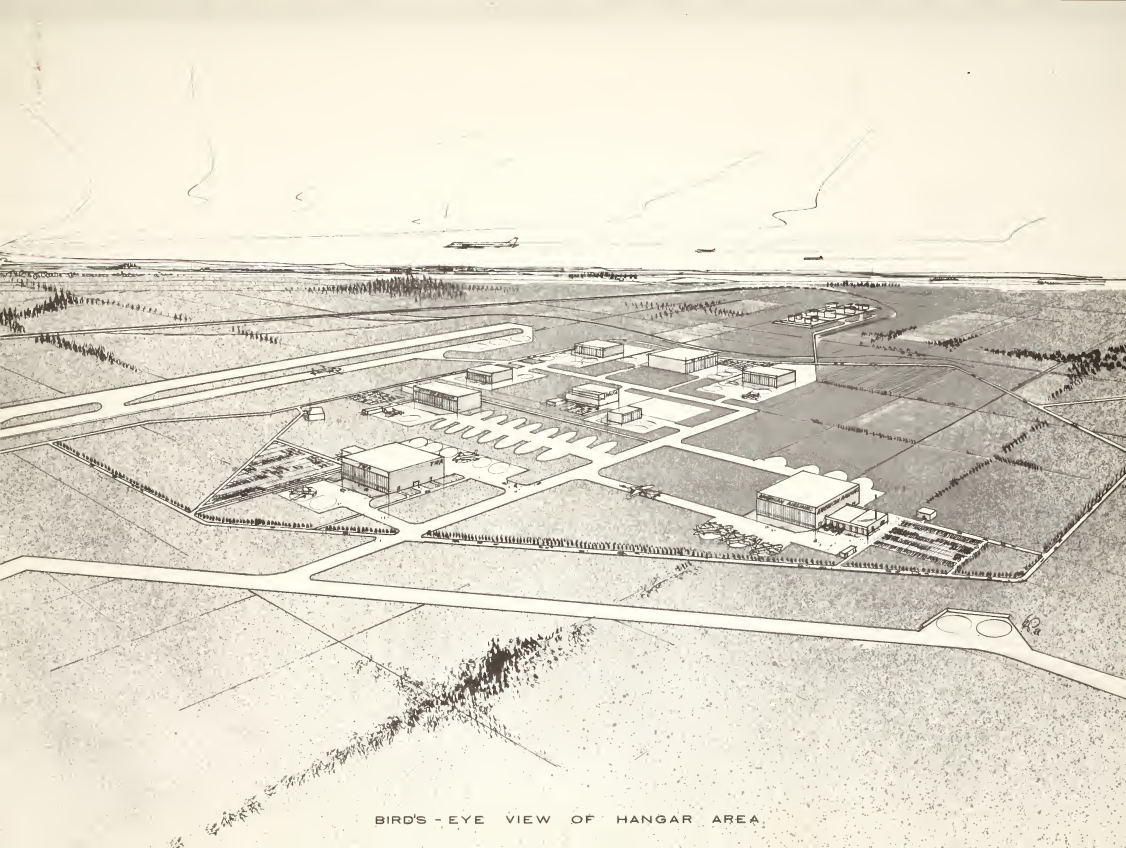
b. Outline Specification: New trackage will be constructed using existing rails, new creosoted ties and crushed stone ballast.

c. Cost Estimate $ 14,000.

2. Overall Grading of Hangar Area:

a. Description: Existing grades in the hangar area vary considerably. It will be necessary to alter these grades to insure proper drainage and to permit aircraft access from a common taxiway into each hangar lot at grades not to exceed the maximum slope of 1-1/2% and at the same time permit access to the existing service roadway on the other side of the lots.

b. Outline Specification: Top soil from the entire area amounting to approximately 800,000 cubic yards will be removed and wasted. Unclassified excavated material beneath the top soil amounting to



BIRD'S - EYE VIEW OF HANGAR AREA

approximately 700,000 cubic yards, will be removed from some areas and deposited and compacted in others to provide suitable final grades for each hangar lot and at the same time maintain an overall balance of cut and fill for the Hangar Area. Open drainage ditches will be provided which will connect to the airport drainage system. Ditches will have side slopes not steeper than 5 to 1 and will be seeded.

c. Cost Estimate $ 554,000.

3. Balance of Roadways in the Hangar and Tank Farm Areas:

a. Description: At present there is a two-lane roadway from the terminal area through the Hangar Area and terminating at Higgins Road. It is planned to extend this roadway to provide access to all of the lots in the Hangar Area as well as to the Tank Farm. In addition, at the request of the airlines, another section of roadway is planned to service the easternmost lots of the Hangar Area and give them a shorter connection to the Terminal Area than is possible if only the existing road is used.

b. Outline Specification: The roadway will be constructed with 3" of bituminous concrete on 10" of compacted water bound macadam and 6" granular sub-base. The roadway will be 25' wide.

c. Cost Estimate $ 372,000.

E. CARGO AREA:

1. Airplane Parking Apron

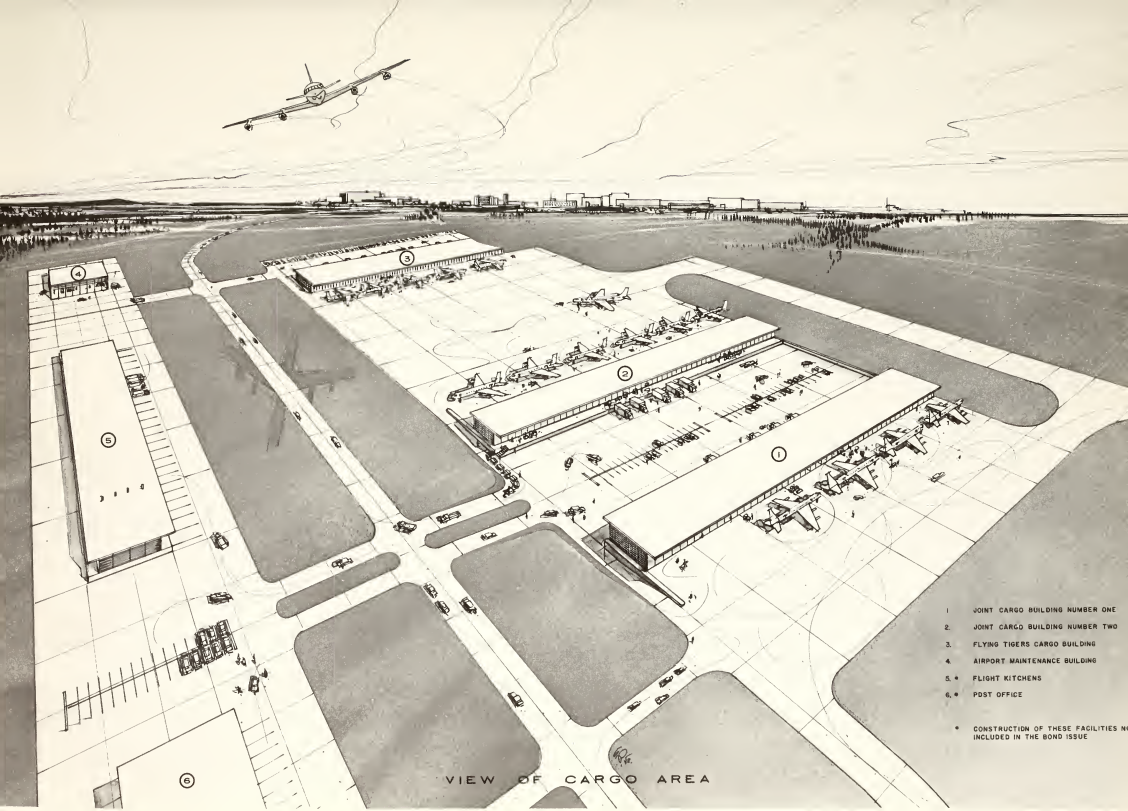
a. Description: The Cargo Area will be located to the east of the Terminal Area and will be connected to it by a system of taxiways and by a roadway.

An airplane parking apron will be constructed on one side of each of the two new joint airline cargo buildings. These aprons will be approximately 800 feet long and 237.5 feet wide and will merge with the public taxiways along their long sides. Both aprons will be able to accommodate 5 airplanes for a total of ten airplane parking positions for loading and unloading of cargo.

The easternmost parking apron will adjoin a similar apron which will be installed by Flying Tiger Line, Inc. which also will build a cargo facility in this location. Financing of this facility will be similar to arrangements for hangar financing. The cost estimate for this facility is included in the separate cost estimates for the hangars.

b. Outline Specification: The airplane parking aprons will be constructed of concrete 15" thick, on a compacted granular sub-base. The total design thickness will be such as to support single wheel loads of 100,000 pounds according to CAA standards. The edge of the apron will be lighted.

c. Cost Estimate $1,035,000.


1 JOINT CARGO BUILDING NUMBER ONE
2. JOINT CARGO BUILDING NUMBER TWO
3. FLYING TIGERS CARGO BUILDING
4. AIRPORT MAINTENANCE BUILDING
5. * FLIGHT KITCHENS
6. * POST OFFICE
* CONSTRUCTION OF THESE FACILITIES NOT INCLUDED IN THE BOND ISSUE

VIEW OF CARGO AREA

2. Roads and Auto and Truck Parking in Cargo Area:

   a. Description: A two lane roadway will be provided to serve the Cargo Area. It will extend from Mannheim Road through the Cargo Area to the Terminal Area apron. A branch road will also connect to the main entrance roadway.

      Between the two new joint airline Cargo Buildings will be a paved area for trucks to park while unloading cargo at both Cargo Buildings. Each of these areas will be 90 feet wide to permit easy maneuverability of large tractor-trailer units into an unloading position. These areas will be depressed approximately 4'-0" below the floor level of the cargo buildings to facilitate truck loading and unloading.

      Between the two truck aprons will be an area 42 feet wide for parking approximately 136 employee cars.

   b. Outline Specification: Pavement will be 3" of bituminous concrete on 10" of compacted water bound macadam and 6" granular sub-base. Area will be drained to a sump and water pumped to flow into the general drainage system by gravity.

   c. Cost Estimate $ 217,000.

3. New Cargo Warehouses:

   a. Description: Two new joint airline cargo buildings will be constructed in

the Cargo Area. Building No. 1 will be 70 feet wide and 768 feet long. Building No. 2 will be 48 feet wide and 768 feet long. The floor lines will be flush with the airplane parking apron on one side and will be approximately 4'-0" above the depressed truck loading area on the other side.

A 10' wide concrete loading dock will be provided along the truck side of Building No. 2 only. Both sides of the buildings will be served by many overhead doors which will open into the large warehouse area. There will be a wide overhang of the roof on both sides of the buildings to protect the door openings and the loading dock from the weather.

The clear height in the interior of the buildings will be 14 feet.

Two toilet areas will be provided in Building No. 2 for the common use of all airline tenants in this building. Three toilet areas will be provided in Building No. 1, one in each of the three spaces in this building.

Interior partitions within each tenant's assigned space shall be by the tenant.

b. Outline Specification:

Structure: Steel frame, concrete floor, foundation and loading dock, steel roof deck.

Exterior: Face brick, motor operated overhead doors.

Interior: Concrete block partitions between airline tenants. Interior partitions within airline space to be by tenant. Concrete floor, exposed ceiling construction, unit heaters. Toilet rooms: Glazed structural tile walls, concrete floors, exposed ceiling construction, metal toilet partitions and wall hung toilet fixtures.

c. Cost Estimate $1,001,000.

F. SERVICE AREAS

1. Fire Station

a. Description: The fire station will be centrally located in an area adjacent to the outer circular taxiway west of existing terminal "B". It will have immediate access to the runway, taxiway and roadway system of the airport via a connection to the existing Tank Farm Road.

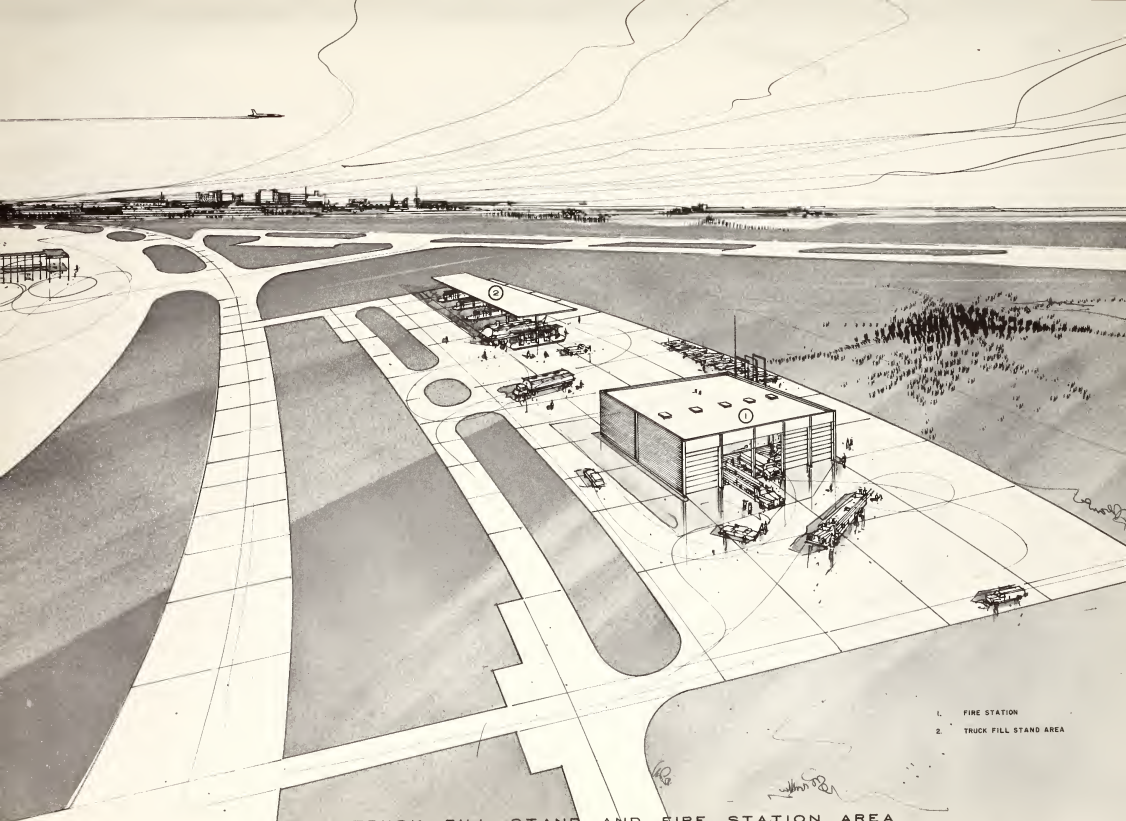
The building will be a two-story structure approximately 90' x 100' with a large apparatus room on the first floor and quarters to accommodate 16 officers and men on duty at a time on the second floor. The apparatus room will be of the so-called "four bay" type with four 14' wide overhead doors on one side. Provision will be made to house the following apparatus, the cost of which is not included in this construction cost estimate:

1 hook and ladder truck
1 pumper truck
1 Cardox truck
1 ambulance
1 pick-up truck

A partial basement is contemplated for storage of supplies. Parking spaces for 20 cars will be provided as well as a paved practice area and roadway access to the Tank Farm Road.

b. Outline Specification:

Structure: Steel frame with concrete fireproofing; reinforced concrete basement and foundation, reinforced concrete floors, precast concrete channel slabs or steel deck roof.



VIEW OF TRUCK FILL STAND AND FIRE STATION AREA

Exterior: Face brick, aluminum windows, plate glass, motorized overhead doors.

Interior:

Apparatus Room: Concrete floors, structural glazed tile walls, hollow metal doors, exposed ceiling construction, surface mounted fluorescent lights.

Living Quarters: "D" color asphalt tile floors, rubber base, plaster walls, suspended metal lath and plaster ceiling, recessed fluorescent lights.

Kitchen, Toilet and Locker Rooms: Greaseproof asphalt tile floor, structural glazed tile walls, suspended metal lath and plaster ceilings, recessed fluorescent lights, metal shower and toilet compartments, metal lockers, metal kitchen equipment, wall hung toilet fixtures.

Paving: 3" bituminous concrete on 12" of water bound macadam.

c. Cost Estimate $ 330,000.

2. Airport Maintenance Building:

a. Description: The airport maintenance building will be one-story structure containing approximately 19,000 sq. ft. of floor space. The building will be located east of the flight kitchen site in the Cargo Area and will contain a large garage area providing eighteen parking spaces of 20' x 30' for large pieces of airport maintenance equipment, two additional spaces for for washing and lubricating the equipment, a carpenter shop, a paint

shop, an electrical shop, a central store room, office space, toilet and locker facilities and a truckers' ready room.

Surrounding the building will be a fenced in paved area approximately 100 feet deep to provide additional storage area and parking for 30 employee automobiles. A 25' roadway will connect to the main cargo area road.

b. Outline Specification:

Structure: Steel frame on concrete foundations. Steel or precast concrete channel slab roof deck.

Exterior: Face brick walls with concrete block back up; metal window frames, glass, motorized overhead doors.

Interior: Concrete floor, concrete block partitions, exposed ceiling construction, industrial fluorescent lights, toilet room shall have structural glazed tile walls, wall hung fixtures and metal toilet partitions.

Paving: 3" bituminous concrete on 12" of water bound macadam.

Fencing: Chain link industrial type 7' high with 3-strand barbed wire.

c. Cost Estimate $ 353,000.

IV SUMMARY OF COST ESTIMATES

SUMMARY OF COST ESTIMATES

The estimates of construction costs which are summarized in this section of the Engineering Report are shown in greater detail in the Appendix.

The cost estimates of the fuel system were prepared by engineers in the office of James P. O'Donnell, New York City, who is the fuel system consultant on this project. He is also retained as the fuel consultant on the Idlewild Airport project for the Port of New York Authority in New York.

Estimates for the construction of the hangars were prepared by the airlines. These estimates include all architectural and engineering fees as well as amounts to cover contingencies. It should be noted that these hangar allowances are the maximum which will be drawn from the revenue bond issue for each hangar. If any hangar is constructed at a cost which exceeds the allowance the excess cost will be borne by the airline involved.

The balance of the cost estimates were prepared by two teams of engineers and estimators in the office of Naess & Murphy. These teams prepared independent estimates which were then consolidated into the estimates which appear in this Report after extensive discussion regarding any value judgments involved.

In general the estimates are based on quantity take-offs times unit prices. Unit prices were based on current prices adjusted, as considered necessary, for increases anticipated during the period prior to construction.

The estimates include amounts for soil borings, soil testing, and surveying. They also include amounts to cover insurance during the period of construction.

Except in case of hangar estimates, which are all inclusive, separate items were added to the cost estimates for other items in the first stage program to cover

contractors' performance bonds, architectural and engineering services (including the cost of preliminary studies and the services of consultants Landrum and Brown and James P. O'Donnell), also 10% has been added to cover contingencies.

SUMMARY OF COST ESTIMATES

A.	RUNWAYS AND TAXIWAYS		
	1.	Taxiways Serving Cargo Area	$ 986,000.
	2.	Improvements to Runway 14R-32L	333,000.
	3.	Taxiway to Hangar Area	1,492,000.
	4.	Outer Circular Taxiway	1,467,000.
	5.	Taxiway Shoulder Stabilization	267,000.
	6.	Blast Fence	7,000.
B.	UTILITIES		
	1.	Water Main to Terminal Area	$1,840,000.
	2.	Water Main to Hangar Area	596,000.
	3.	Terminal Area Water Reservoir	711,000.
	4.	Sanitary Sewer to Hangar Area	605,000.
	5.	Airport Storm Drainage Improvements	942,000.
	6.	Cargo Area Utilities	208,000.
	7.	New Heating and Refrigeration Plant	4,530,000.
	8.	Fueling System	5,413,000.
C.	TERMINAL AREA		
	1.	New Terminal Buildings and Concourses	$23,500,000.
	2.	New Apron Paving	9,014,000.

	3.	Main Entrance Roadway	$1,166,000.
	4.	Parking Lot	1,610,000.
	5.	Landscaping	500,000.
	6.	Apron Paving - Split Finger B	410,000.
	7.	Alterations to Terminal B and Concourse	1,520,000.
D.	HANGAR AREA		
	1.	Railroad Connection	$ 14,000.
	2.	Overall Grading	554,000.
	3.	Balance of Hangar Roads	372,000.
E.	CARGO AREA		
	1.	Airplane Parking Apron	$1,035,000.
	2.	Roads and Truck Parking	217,000.
	3.	Cargo Warehouses	1,001,000.
F.	SERVICE AREAS		
	1.	Fire Station	$ 330,000.
	2.	Airport Maintenance Building	353,000.
		Sub-Total	$60,993,000.

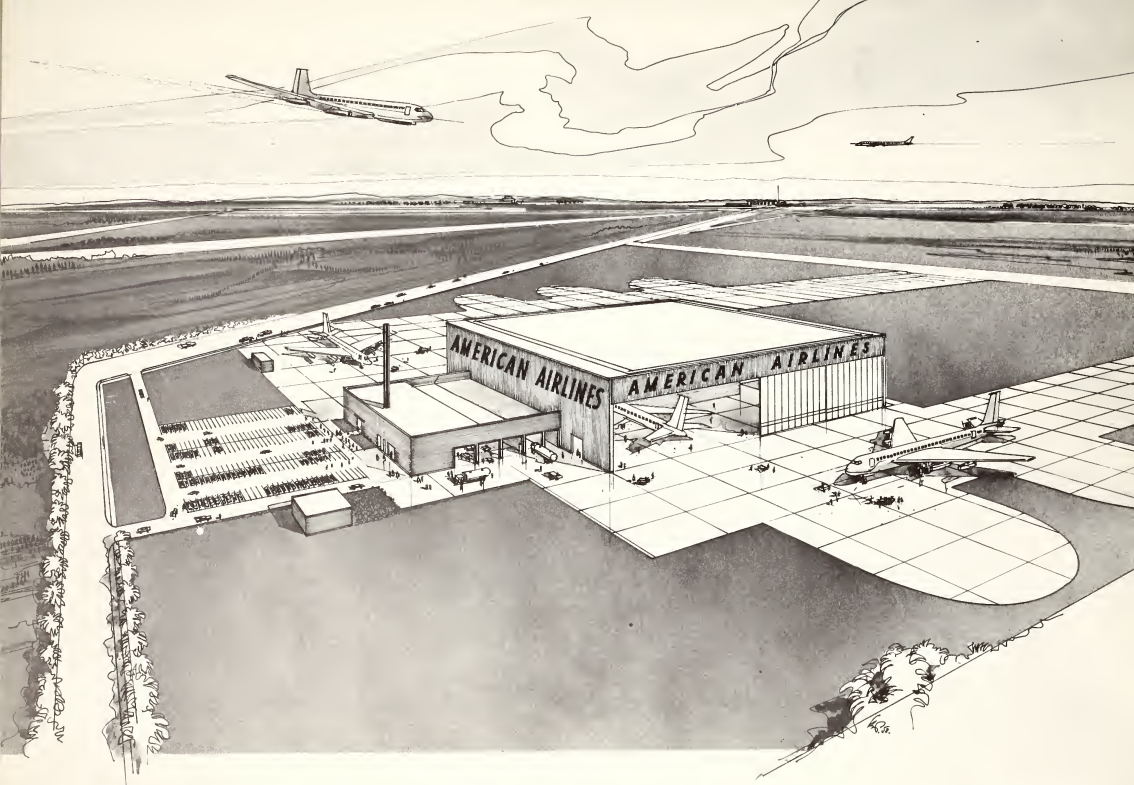
Sub-Total Brought Forward from Page 57	$60,993,000.
Performance Bond @ 1%	609,000.
Architect's Fee	
Preliminary Work (including consultants)	350,000
Working Drawings and Supervision @ 5-1/2%	3,388,000.
	$65,340,000.
Contingency @ 10%	6,534,000.
Total	$71,874,000.

Cost of Hangars:*

(Lump sum allowances requested by airlines)

American	$7,500,000.	
Capital	3,200,000.	
Delta	1,750,000.	
Eastern	3,820,000.	
Flying Tigers	700,000.	
North Central	1,000,000.	
Northwest (Braniff)	1,750,000.	
Ozark	750,000.	
Transworld	5,000,000.	
United	5,000,000.	30,470,000.
	GRAND TOTAL	$102,344,000.

* These hangar allowances are the maximum which will be drawn from the revenue bond issue. If any hangar is constructed at a cost which exceeds these allowances the excess cost will be borne by the airline involved.



VIEW OF AMERICAN AIRLINES HANGAR AREA

V. APPENDIX

a. Supporting Details of Cost Estimates
b. Anticipated Construction Schedule
c. Exhibits Delineating First Stage Construction Program

a. SUPPORTING DETAILS OF COST ESTIMATES

SUPPORTING DETAILS OF COST ESTIMATES

	Unit	Qty.	Price	Total
A. RUNWAYS AND TAXIWAYS				
1. Taxiways Serving Cargo Area				
Taxiway	S.Y.	39,444	$ 20.00	$ 788,880.
Shoulder Stabilization	S.Y.	10,000	8.00	80,000.
French Drains	L.F.	3,600	6.00	21,600.
Electric Work		L.S.		96,000.
Total				$ 986,480.
2. Improvements Runway 14R-32L				
Fill Ditch	C.Y.	250,000	$ 1.00	$ 250,000.
Electric Work		L.S.		83,000.
Total				$ 333,000.
3. Taxiway to Hangar Area				
Taxiway	S.Y.	51,250	$ 20.00	$1,025,000.
Shoulder Stabilization	S.Y.	34,167	8.00	273,336.
French Drains	L.F.	12,300	6.00	73,800.
Electric Work		L.S.		120,000.
Total				$1,492,136.
4. Outer Circular Taxiway				
Taxiway	S.Y.	39,166	$ 20.00	$ 783,320.
Shoulder Stabilization	S.Y.	26,111	8.00	208,888.
French Drains	L.F.	9,400	6.00	56,400.
Electrical Work		L.S.		418,000.
Total				$1,466,608.
5. Taxiway Shoulder Stabilization				
Shoulder Stabilization	S.Y.	21,000	$ 8.00	$ 168,000.
French Drains	L.F.	6,500	6.00	39,000.
Electrical Work		L.S.		60,000.
Total				$ 267,000.

		Unit	Qty.	Price	Total
6.	Blast Fence	L.F.	700	$10.00	$ 7,000.

B. UTILITIES

1. Water Main to Terminal Area

Meter House	L.S.		$ 16,500.
Electric Work	L.S.		25,000.
Heating	L.S.		9,000.
Meter and Chlorinator	L.S.		48,000.
Piping	L.S.		1,741,500.
Total			$1,840,000.

2. Water Main to Hangar Area

Equipment	L.S.		5,000.
Piping	L.S.		591,000.
Total			$ 596,000.

3. Terminal Area Water Reservoir

Concrete Reservoir	L.S.		$ 150,000.
Electric Work	L.S.		47,000.
Pumping Equipment	L.S.		250,000.
Meters	L.S.		15,000.
Piping	L.S.		249,000.
Total			$ 711,000.

4. Sanitary Sewer to Hangar Area

Lift Station	L.S.		$ 30,000.
Pipe and Manholes	L.S.		575,000.
Total			$ 605,000.

5. Airport Storm Drainage Improvements

Grading		L.S.		$ 25,000.
15" R. C. Pipe	L.F.	4,600	$ 6.00	27,600.
24" " "	L.F.	6,400	11.50	73,600.
30" " "	L.F.	2,500	13.50	33,750.
36" " "	L.F.	7,400	20.00	148,000.
48" " "	L.F.	7,750	26.00	201,500.
60" " "	L.F.	13,000	33.27	432,510.
Total				$ 941,960.

	Unit	Qty.	Price	Total
6. Cargo Area Utilities				
Fire Protection		L.S.		$ 63,000.
City Water		L.S.		56,500.
Sanitary Sewer		L.S.		84,000.
Water Meters		L.S.		4,500.
Total				$ 208,000.
7. New Heating and Refrigeration Plant				
Building		L.S.		$ 630,000.
Tunnels	L.F.	3,600	$106.00	381,600.
Electrical Work		L.S.		665,000.
Tunnel Piping		L.S.		977,000.
Heating Equipment		L.S.		890,000.
Refrigeration Equipment				921,000.
Sump Pumps				15,000.
Macadam Paving	S.Y.	6,250	8.00	50,000.
Total				$4,529,600.
8. Fueling System				
Tank Farm Area				
Mechanical Equipment (bulk tanks pumps and filter separators)				$ 448,000.
Piping				751,000.
Earthwork (Dikes, foundations, grading)				142,000.
Paving (truck parking)				69,000.
Concrete (foundations for pumps and separators)				12,000.
Fire Protection System				130,000.
Drainage				30,000.
Control House and Controls				50,000.
Electrical Work				320,000.
Tank Car Unloading Facilities (railroad sidings, pumps, piping and filter separators)				350,000.
Sub Total				$2,302,000.
Terminal Area				
Mechanical Equipment (satellite tanks, pumps, filter, separators)				$ 925,000.
Piping				1,287,000.
Truck Fill Stands				209,000.
Electrical Work and Controls				690,000.
Sub Total				$3,111,000.
Total				$5,413,000.

	Unit	Qty.	Price	Total
C. TERMINAL AREA				
1. New Terminal Buildings and Concourses				
Terminal "D"				
Excavation Mass	C.Y.	17,488	$ 1.50	$ 26,232.
Excavation Trench	C.Y.	4,579	7.00	32,053.
Excavation Backfill	C.Y.	3,043	1.00	3,043.
Excavation Strip Top Soil	C.Y.	5,280	1.00	5,280.
Concrete Work	C.Y.	3,215	65.00	208,975.
Reinforcing Steel	T	241	225.00	54,225.
Metal Pans	S.F.	30,000	.35	10,500.
Ground Floor Concrete	C.Y.	1,709	25.00	42,725.
Ground Floor Finish	S.F.	61,125	.15	9,169.
Ground Floor Mesh	S.F.	67,240	.15	10,086.
Structural Steel, Deck and L.W. Concrete Fill	S.F.	249,380	4.25	1,059,865.
Back Up Tile, Plaster, Paint	S.F.	22,410	1.50	33,615.
Precast Granite Facing	S.F.	22,734	5.00	113,670.
Balcony Construction at Mezzanine Floor	S.F.	13,840	7.50	103,800.
Part'ns., Tile, Plaster, Paint	S.F.	104,135	1.40	145,789.
Plaster Ceiling in Toilets	S.Y.	767	7.50	5,752.
Counters, Baggage	C.F.	3,480	1.00	3,480.
Counters, Ticket	C.F.	5,250	3.00	15,750.
Roofing and Insulation	SQ.	1,053	50.00	52,650.
Sheet Metal		L.S.		24,800.
Entrance Doors		L.S.		46,750.
Hollow Metal Doors & Frames	EA.	133	300.00	39,900.
Glass and Alum. Partns.	S.F.	14,478	5.00	72,390.
Exterior 3/8" Heat Absorbing Glass	S.F.	42,816	5.00	214,080.
Exterior Alum. Framing	S.F.	42,816	2.25	96,336.
Plastic Faced Fabric	S.F.	25,000	1.00	25,000.
Painting Other Than Noted	S.F.	495,000	.15	74,250.
Stairs, Steel Pan Const.		L.S.		24,900.
Misc. Orn. Iron	S.F.	495,000	.20	99,000.
Steel Canopies Elevated Rd.	S.F.	24,048	5.00	120,240.
Steel Bridges Elevated Rd.	S.F.	6,000	7.50	45,000.
Overhead Doors	EA.	10	300.00	3,000.
Penthouse Enclosure	S.F.	9,960	5.00	49,800.
Marble	S.F.	5,000	7.00	35,000.
Tile Work, Wall	S.F.	5,740	2.25	12,915.
Tile Work, Floor	S.F.	6,900	2.00	13,800.
Toilet Mirrors, etc.		L.S.		1,200.
Toilet Partitions	EA.	90	150.00	13,500.
Terrazzo Floors	S.F.	158,770	$ 1.50	$ 238,155.

	Unit	Qty.	Price	Total
Asphalt Tile	S.F.	30,040	$ .35	$ 10,514.
Metal Acoustic Tile	S.F.	193,310	1.25	241,638.
Waiting Room Seating		L.S.		17,150.
Elevators		L.S.		120,000.
Escalators		L.S.		170,000.
Sub Total Bldg. "D"				$ 3,745,977.
Sub Total Bldg. "F"				$ 3,745,977.
Restaurant Building				
General Work (shell)	S.F.	82,214	20.00	1,644,280.
Concourses				
Corridors, Departure Rooms	S.F.	480,300	10.20	4,899,060.
Operations Areas	S.F.	82,375	12.00	788,500.
Tunnel		L.S.		657,113.
Sub Total Concourses				$ 6,544,673.
Sub Total All General Work				$15,680,907.
Electrical Work		L.S.		2,631,000.
Plumbing and Heating		L.S.		2,969,000.
Vent. and Air Cond.		L.S.		2,219,000.
Total Terminal Buildings				$23,499,907.

2. New Apron Paving

8" Concrete Paving	S.Y.	83,756	12.00	$ 1,005,072.
15" Concrete Paving	S.Y.	357,633	20.00	7,152,660.
Stabilized Shoulders	S.Y.	20,834	8.00	166,672.
Electrical Work		L.S.		690,000.
Total				$ 9,014,404.

3. Main Entrance Roadway

Elevated Road	S.Y.	19,334	45.00	$ 870,030.
Grade Level Road	S.Y.	12,778	4.65	59,418.
Curbs and Gutters	L.F.	20,050	3.00	60,150.
Fence	L.F.	6,700	4.00	26,800.
Electrical Work		L.S.		150,000.
Total				$ 1,166,398.

		Unit	Qty.	Price	Total
4.	Parking Lot				
	Macadam Paving	S.Y.	295,427	$ 4.65	$1,373,736.
	Remove Existing Concrete	S.Y.	5,280	3.00	15,840.
	Remove Existing Boiler House		L.S.		25,000.
	Remove Existing Cargo Bldg.		L.S.		5,000.
	Remove Existing Macadam	S.Y.	140,167	.50	70,083.
	Electrical Work		L.S.		120,000.
	Total				$1,609,659.
5.	Landscaping		L.S.		$ 500,000.
6.	Apron Paving Split Finger "B"	S.Y.	27,300	$15.00	$ 410,000.
7.	Alteration to Terminal B				
	General Work		L.S.		$1,206,000.
	Mechanical Work		L.S.		238,000.
	Electrical Work		L.S.		76,000.
	Total				$1,520,000.
D.	HANGAR AREA				
1.	Railroad Connection	L.F.	400	$35.00	$ 14,000.
2.	Overall Grading	C.Y.	1,584,000	.35	554,000.
3.	Balance of Hangar Roads				
	Macadam Pavement	S.Y.	41,667	4.65	193,752.
	Bridge		L.S.		78,472.
	Electrical Work		L.S.		100,000.
	Total				$ 372,224.
E.	CARGO AREA				
1.	Aircraft Parking Apron				
	15" Concrete Pavement	S.Y.	48,750	$20.00	$ 975,000.
	Electrical Work		L.S.		60,000.
	Total				$1,035,000.

	Unit	Qty.	Price	Total
2. Roads and Truck Parking				
Macadam Pavement	S.Y.	27,111	$ 4.65	$ 126,000.
Electrical Work		L.S.		91,000.
Total				$ 217,000.
3. Cargo Warehouses				
General Work	S.F.	92,160	9.00	$ 829,440.
Mechanical Work		L.S.		90,000.
Electrical Work		L.S.		81,560.
Total				$1,001,000.

F. SERVICE AREAS

1. Fire Station				
General Work		L.S.		$ 210,000.
Mechanical Work		L.S.		60,000.
Electrical Work		L.S.		30,000.
Macadam Paving		L.S.		30,000.
Total				$ 330,000.
2. Airport Maintenance Building				
General Work		L.S.		$ 240,000.
Mechanical Work		L.S.		25,000.
Electrical Work		L.S.		20,000.
Macadam Paving		L.S.		68,000.
Total				$ 353,000.

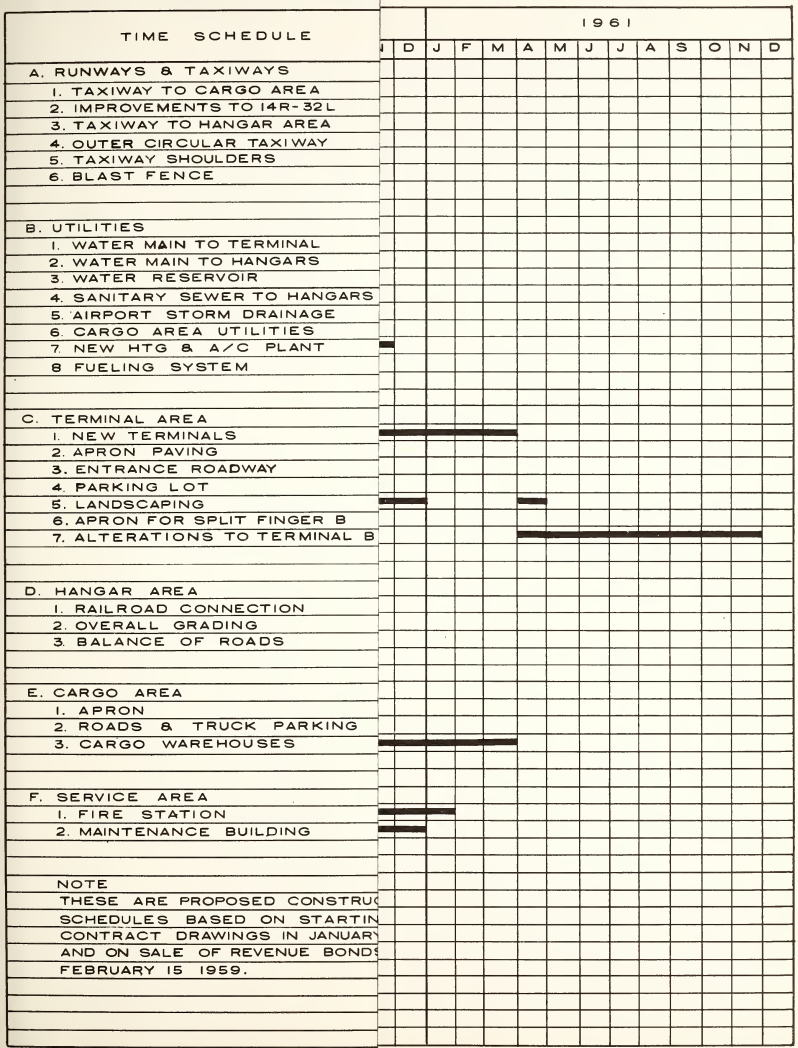
Code:

S.Y.	Square Yard
C.Y.	Cubic Yard
L.F.	Lineal Foot
L.S.	Lump Sum
T	Ton
EA.	Each
SQ.	Square

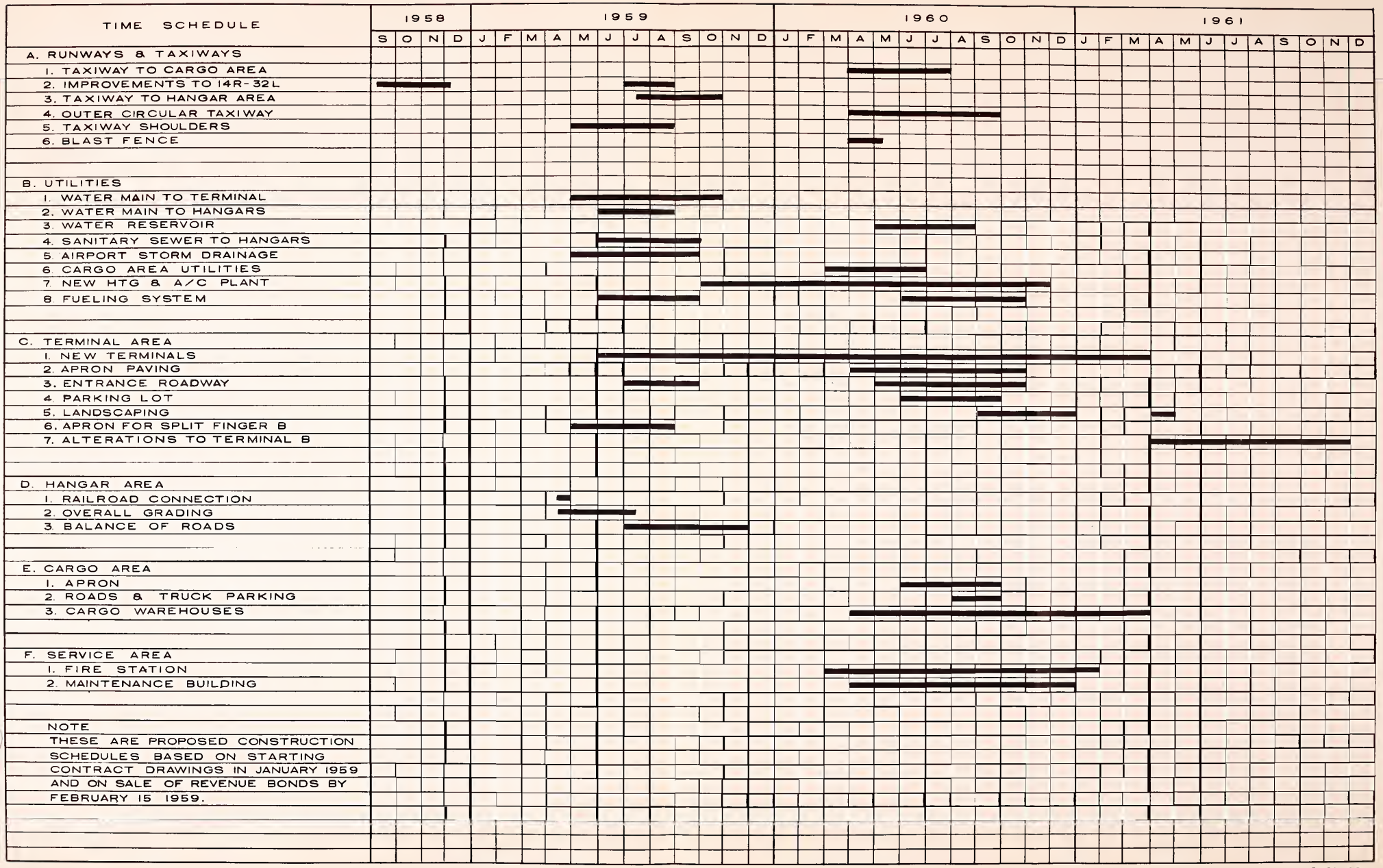
b. ANTICIPATED CONSTRUCTION SCHEDULE

O'HARE FIELD CHICAGO INT

CONSTRUCTION SCHEDULE



O'HARE FIELD CHICAGO INTERNATIONAL AIRPORT
CONSTRUCTION SCHEDULE


TIME SCHEDULE
1958
S O N D
1959
J F M A M J J A S O N D
1960
J F M A M J J A S O N D
1961
J F M A M J J A S O N D
A. RUNWAYS & TAXIWAYS
1. TAXIWAY TO CARGO AREA
2. IMPROVEMENTS TO 14R-32L
3. TAXIWAY TO HANGAR AREA
4. OUTER CIRCULAR TAXIWAY
5. TAXIWAY SHOULDERS
6. BLAST FENCE
B. UTILITIES
1. WATER MAIN TO TERMINAL
2. WATER MAIN TO HANGARS
3. WATER RESERVOIR
4. SANITARY SEWER TO HANGARS
5. AIRPORT STORM DRAINAGE
6. CARGO AREA UTILITIES
7. NEW HTG & A/C PLANT
8. FUELING SYSTEM
C. TERMINAL AREA
1. NEW TERMINALS
2. APRON PAVING
3. ENTRANCE ROADWAY
4. PARKING LOT
5. LANDSCAPING
6. APRON FOR SPLIT FINGER B
7. ALTERATIONS TO TERMINAL B
D. HANGAR AREA
1. RAILROAD CONNECTION
2. OVERALL GRADING
3. BALANCE OF ROADS
E. CARGO AREA
1. APRON
2. ROADS & TRUCK PARKING
3. CARGO WAREHOUSES
F. SERVICE AREA
1. FIRE STATION
2. MAINTENANCE BUILDING
NOTE
THESE ARE PROPOSED CONSTRUCTION SCHEDULES BASED ON STARTING CONTRACT DRAWINGS IN JANUARY 1959 AND ON SALE OF REVENUE BONDS BY FEBRUARY 15 1959.

c. EXHIBITS DELINEATING FIRST STAGE CONSTRUCTION PROGRAM

Exhibit		Page
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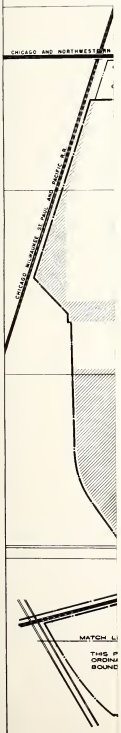
19.	Airline Cargo Building Space	89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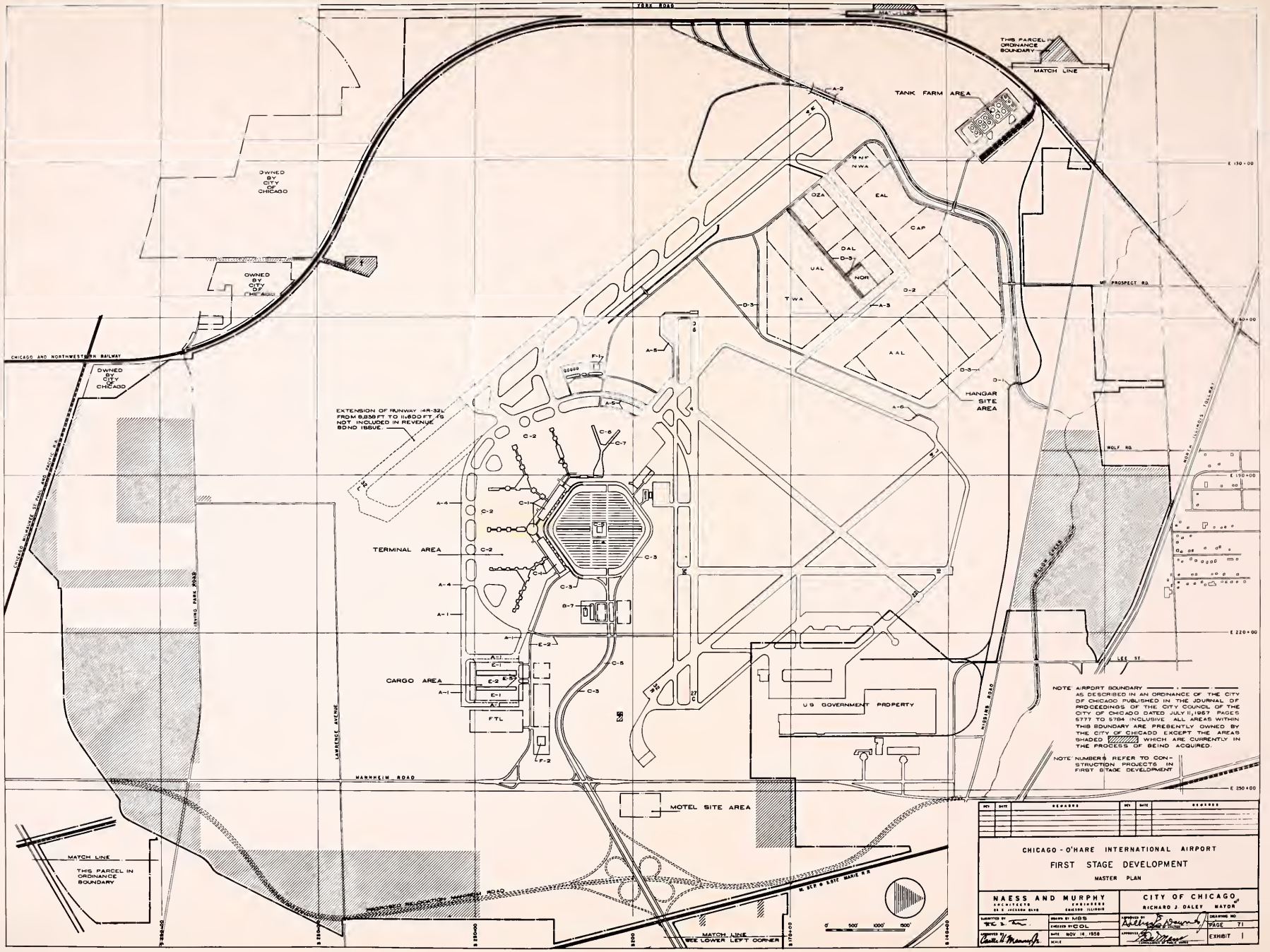

NOTE AIRPORT BOUNDARY
AS DESCRIBED IN AN ORDINANCE OF THE CITY OF CHICAGO PUBLISHED IN THE JOURNAL OF PROCEEDINGS OF THE CITY COUNCIL OF THE CITY OF CHICAGO DATED JULY 11, 1957 PAGES 5777 TO 5784 INCLUSIVE. ALL AREAS WITHIN THIS BOUNDARY ARE PRESENTLY OWNED BY THE CITY OF CHICAGO EXCEPT THE AREAS SHADED ▨ WHICH ARE CURRENTLY IN THE PROCESS OF BEING ACQUIRED.

NOTE NUMBERS REFER TO CONSTRUCTION PROJECTS IN FIRST STAGE DEVELOPMENT

NO.	DATE	REMARKS	NO.	DATE	REMARKS

CHICAGO - O'HARE INTERNATIONAL AIRPORT

FIRST STAGE DEVELOPMENT

MASTER PLAN

NAESS AND MURPHY
ENGINEERS
20 E. JACKSON BLVD. CHICAGO, ILLINOIS

SUBMITTED BY: R. E. Naess
DRAWN BY: MBS
CHECKED BY: COL
DATE: NOV 14 1958
SCALE:

CITY OF CHICAGO
RICHARD J. DALEY MAYOR

APPROVED BY: Richard J. Daley
APPROVED BY: Wm. Dillon

DRAWING NO. PAGE 71
EXHIBIT 1

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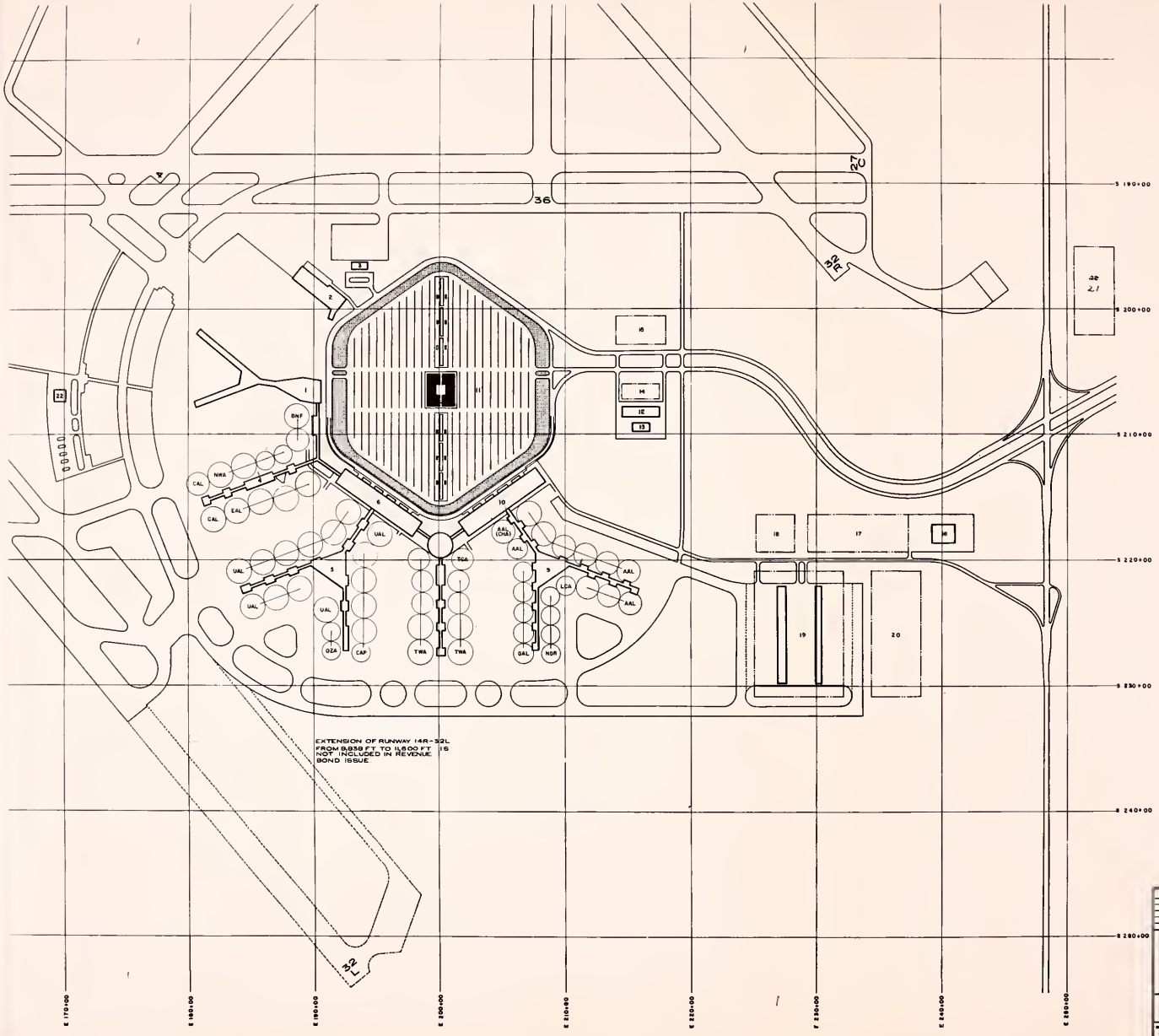


LEGEND

1. EXISTING TERMINAL BUILDING (B) AND CONCOURSE
2. EXISTING BASE OPERATOR HANGAR
3* PROPOSED INTERIM INTERNATIONAL BUILDING
4. FINGER (C)
5. FINGER (D)
6. TERMINAL BUILDING (G)
7. RESTAURANT
8. FINGER (E)
9. FINGER (F)
10. TERMINAL BUILDING (F)
11. PARKING
12. HEATING AND REFRIGERATION PLANT
13. COOLING TOWER
14* AUTOMOBILE SERVICE STATION SITE
15* RENT-A-CAR PARKING AND SERVICE SITE
16* POST OFFICE SITE
17* FLIGHT KITCHEN SITE
18. AIRPORT MAINTENANCE BUILDING
19. AIRLINE CARGO BUILDINGS
20. FLYING TIGERS CARGO SITE
21* MOTEL SITE
22. FIRE STATION

* CONSTRUCTION OF THESE FACILITIES NOT INCLUDED IN THE BOND ISSUE.

0 500' 1000'

REV.	DATE	REMARKS	REV.	DATE	REMARKS

CHICAGO O'HARE INTERNATIONAL AIRPORT

FIRST STAGE DEVELOPMENT

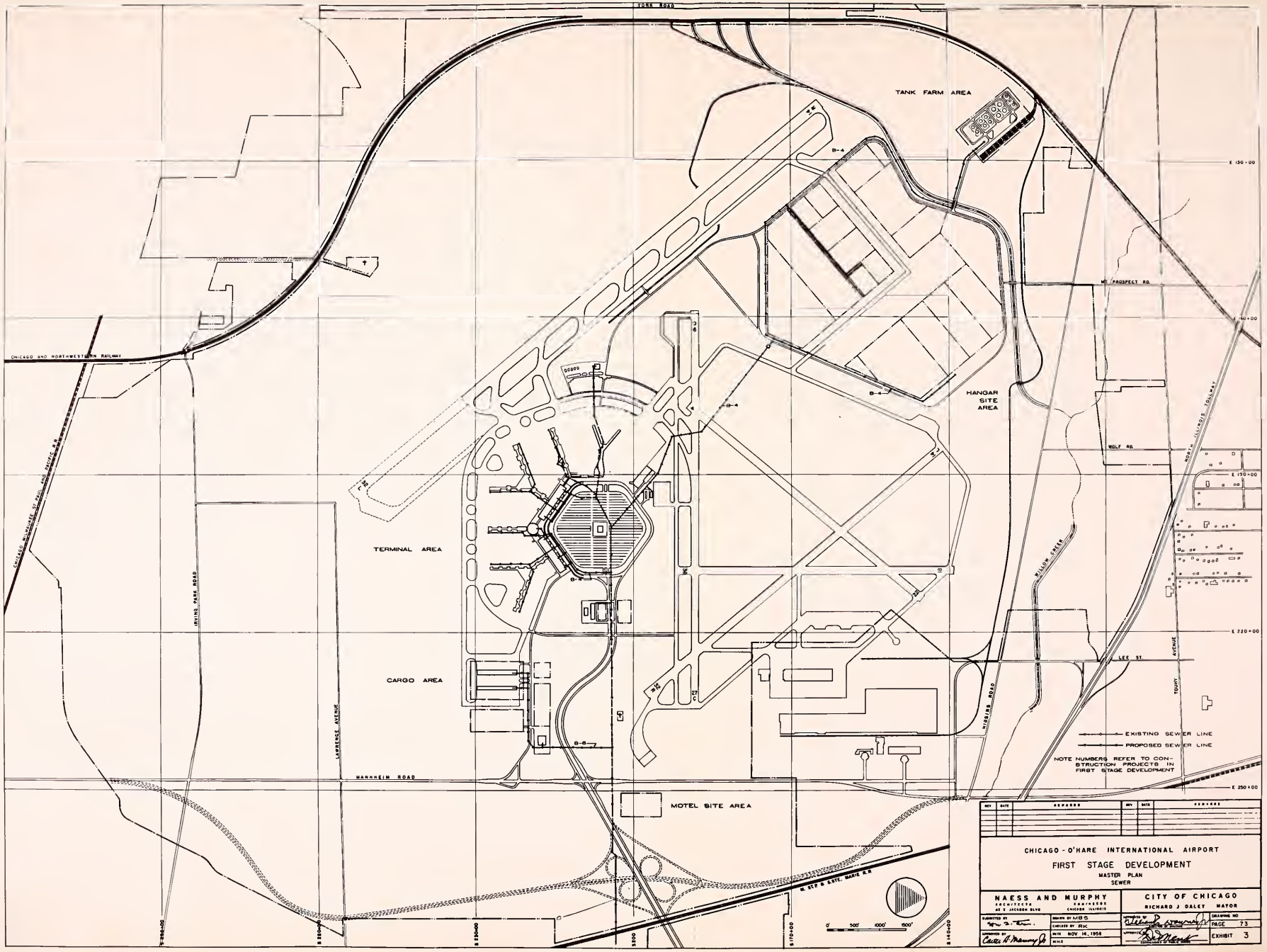
SITE PLAN

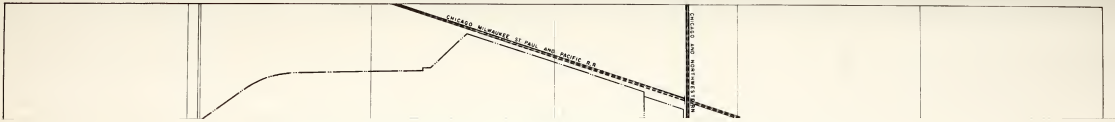
NAESS AND MURPHY
ARCHITECTS ENGINEERS
66 E. JACKSON BLVD. CHICAGO, ILLINOIS

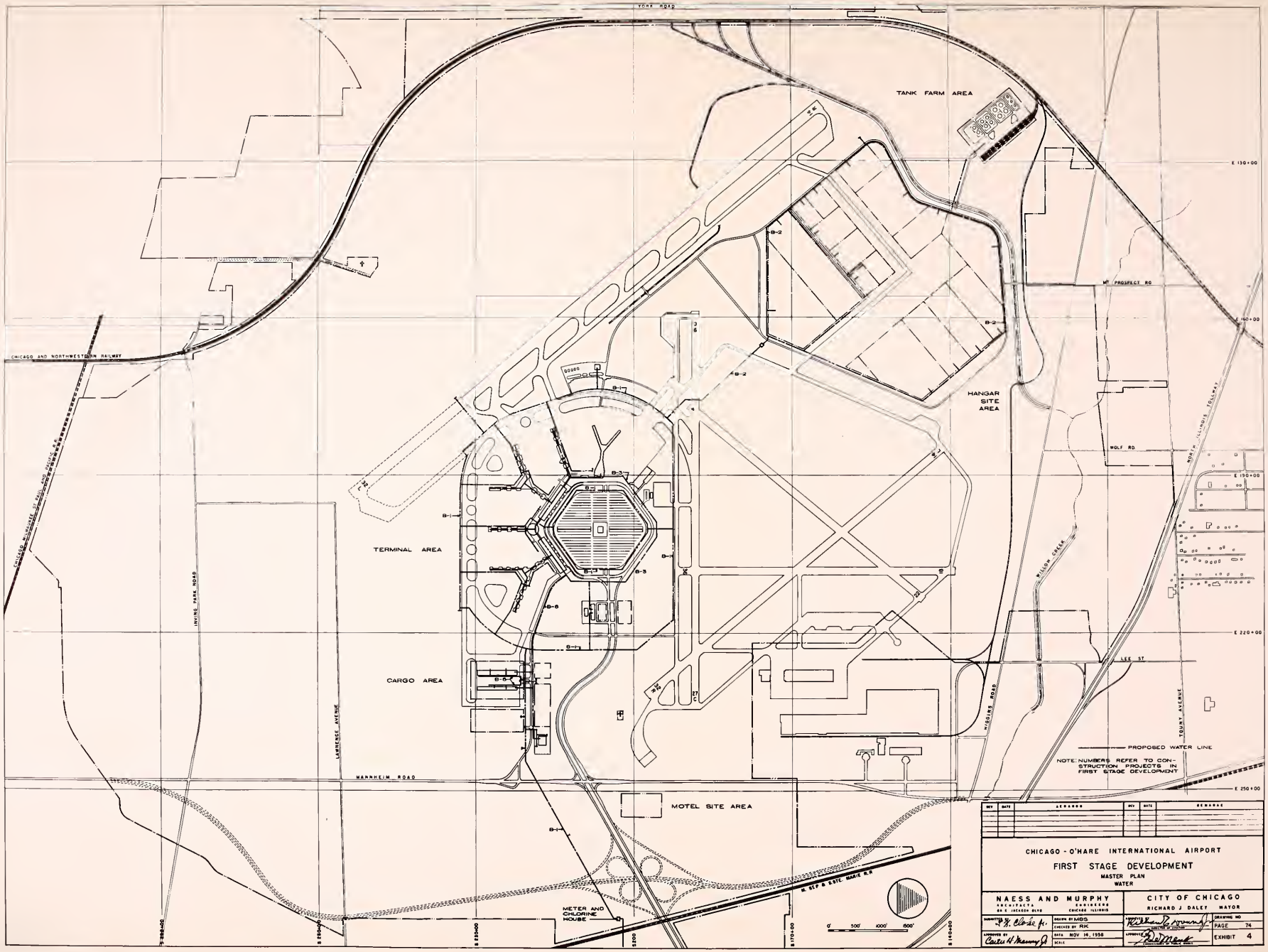
CITY OF CHICAGO
RICHARD J. DALEY MAYOR

SUBMITTED BY
DRAWN BY O.L.-O.S.
CHECKED BY C.O.L.
DATE NOV. 14, 1958
APPROVED BY
APPROVED BY
DRAWING NO. PAGE 72
EXHIBIT 2

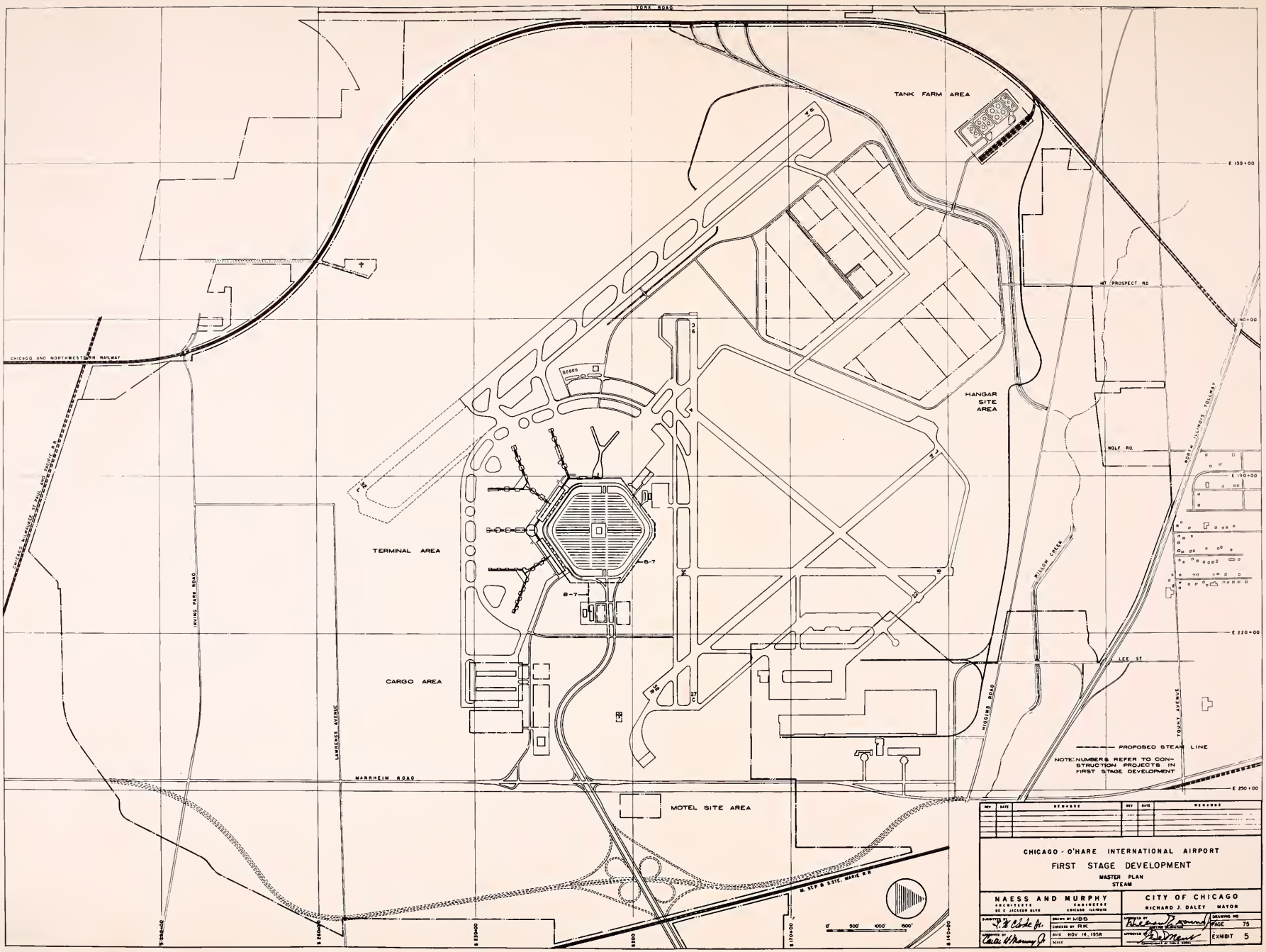
CHICAGO AND NORTHWESTERN
CHICAGO, MILWAUKEE, ST. PAUL AND PACIFIC R.R.


YORK ROAD
TANK FARM AREA
E 130+00
MT PROSPECT RD.
E 140+00
CHICAGO AND NORTHWESTERN RAILWAY
HANGAR SITE AREA
WOLF RD.
E 150+00
NORTH ILLINOIS TOLLWAY
TERMINAL AREA
IRVING PARK ROAD
WILLOW CREEK
E 220+00
LEE ST.
AVENUE
TOUHY
CARGO AREA
LAWRENCE AVENUE
MIDWAY ROAD
EXISTING SEWER LINE
PROPOSED SEWER LINE
NOTE NUMBERS REFER TO CONSTRUCTION PROJECTS IN FIRST STAGE DEVELOPMENT
MANNHEIM ROAD
E 250+00
MOTEL SITE AREA
CHICAGO - O'HARE INTERNATIONAL AIRPORT
FIRST STAGE DEVELOPMENT
MASTER PLAN
SEWER
NAESS AND MURPHY
ENGINEERS
CHICAGO, ILLINOIS
CITY OF CHICAGO
RICHARD J DALEY MAYOR
DRAWN BY MBS
CHECKED BY RJK
NOV 14, 1958
DRAWING NO
PAGE 73
EXHIBIT 3


CHICAGO MILWAUKEE ST PAUL AND PACIFIC R.R.
CHICAGO AND NORTH WESTERN R.R.


YORK ROAD
TANK FARM AREA
E 130+00
E 140+00
E 150+00
E 220+00
E 250+00
MT PROSPECT RD
WOLF RD
CHICAGO AND NORTHWESTERN RAILWAY
CHICAGO, MILWAUKEE, ST PAUL AND PACIFIC R.R.
NORTH ILLINOIS TOLLWAY
HANGAR SITE AREA
TERMINAL AREA
CARGO AREA
IRVING PARK ROAD
LAWRENCE AVENUE
WILLOW CREEK
MILWAUKEE ROAD
LEE ST
MOUNT AVENUE
WANNKEIM ROAD
MOTEL SITE AREA
METER AND CHLORINE HOUSE
M. REP. & STE. MARIE R.R.
B-1
B-2
B-3
B-4
B-5
B-6
B-7
PROPOSED WATER LINE
NOTE: NUMBERS REFER TO CONSTRUCTION PROJECTS IN FIRST STAGE DEVELOPMENT
CHICAGO - O'HARE INTERNATIONAL AIRPORT
FIRST STAGE DEVELOPMENT
MASTER PLAN
WATER
NAESS AND MURPHY
ENGINEERS
CITY OF CHICAGO
RICHARD J DALEY MAYOR
DRAWN BY MGS
CHECKED BY RK
DATE NOV 14, 1958
SCALE
DRAWING NO
PAGE 74
EXHIBIT 4

CHICAGO AND NORTH-WESTERN R
CHICAGO, MILWAUKEE, ST. PAUL AND PACIFIC R.R.



REV	DATE	REMARKS	REV	DATE	REMARKS

CHICAGO - O'HARE INTERNATIONAL AIRPORT

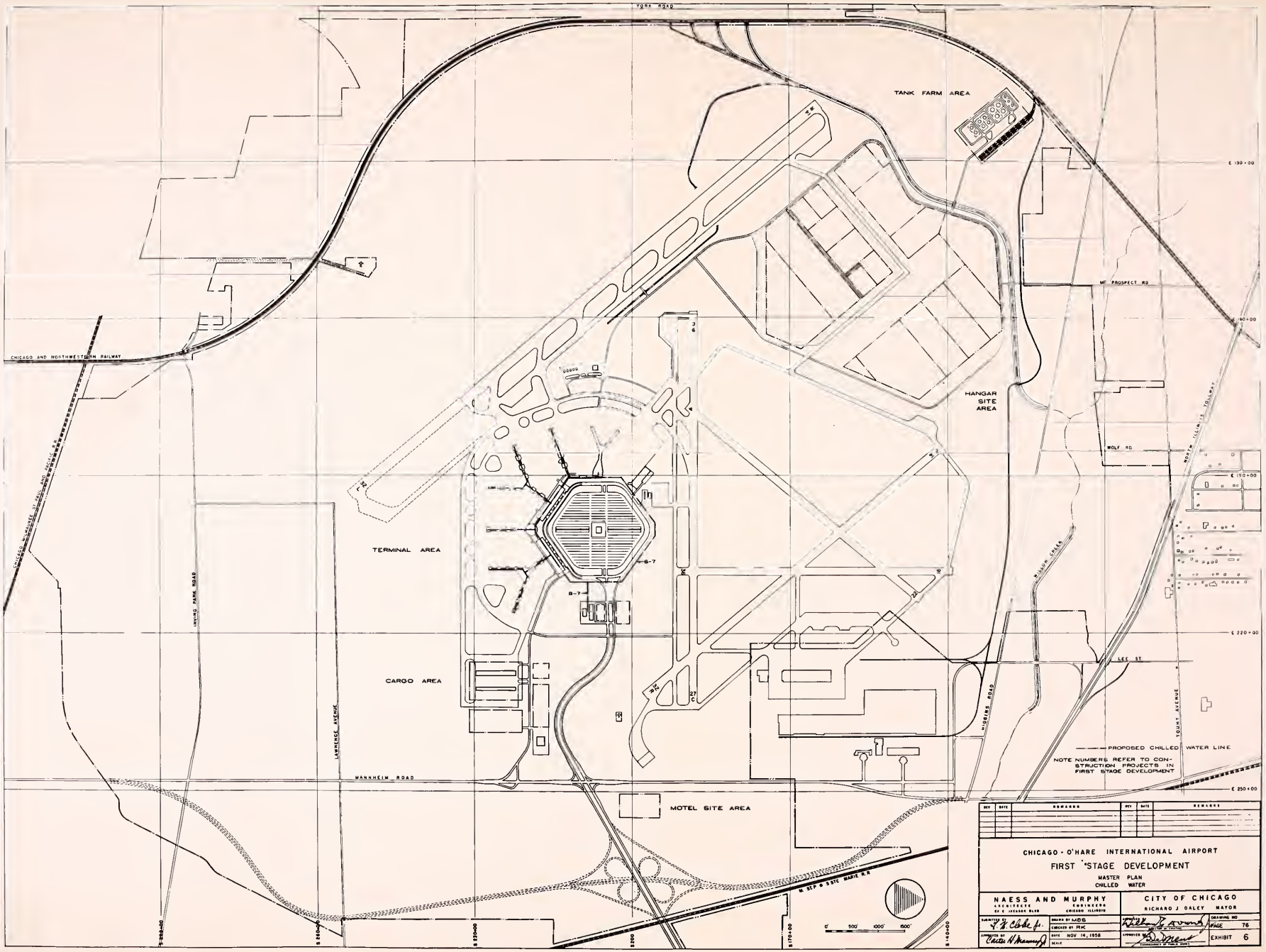
FIRST STAGE DEVELOPMENT

MASTER PLAN

STEAM

NAESS AND MURPHY ARCHITECTS ENGINEERS 66 E. JACKSON BLVD. CHICAGO, ILLINOIS	CITY OF CHICAGO RICHARD J. DALEY MAYOR
SUBMITTED BY: C. B. Clyde Jr.	DRAWN BY: MBS CHECKED BY: RK
APPROVED BY: Walter H. Moorman Jr.	DATE: NOV 14, 1958 SCALE:
APPROVED BY: Richard J. Daley COMMISSIONER OF PUBLIC WORKS	DRAWING NO PAGE 75 EXHIBIT 5

CHICAGO AND NORTHWESTERN



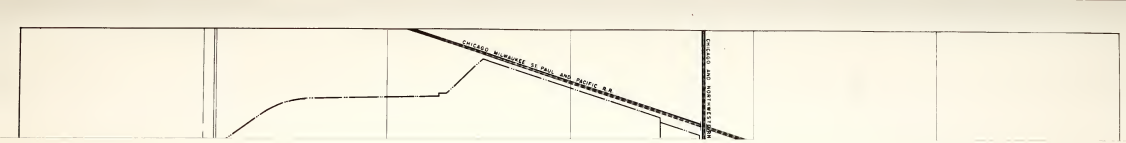
DEV	DATE	REMARKS	DEV	DATE	REMARKS

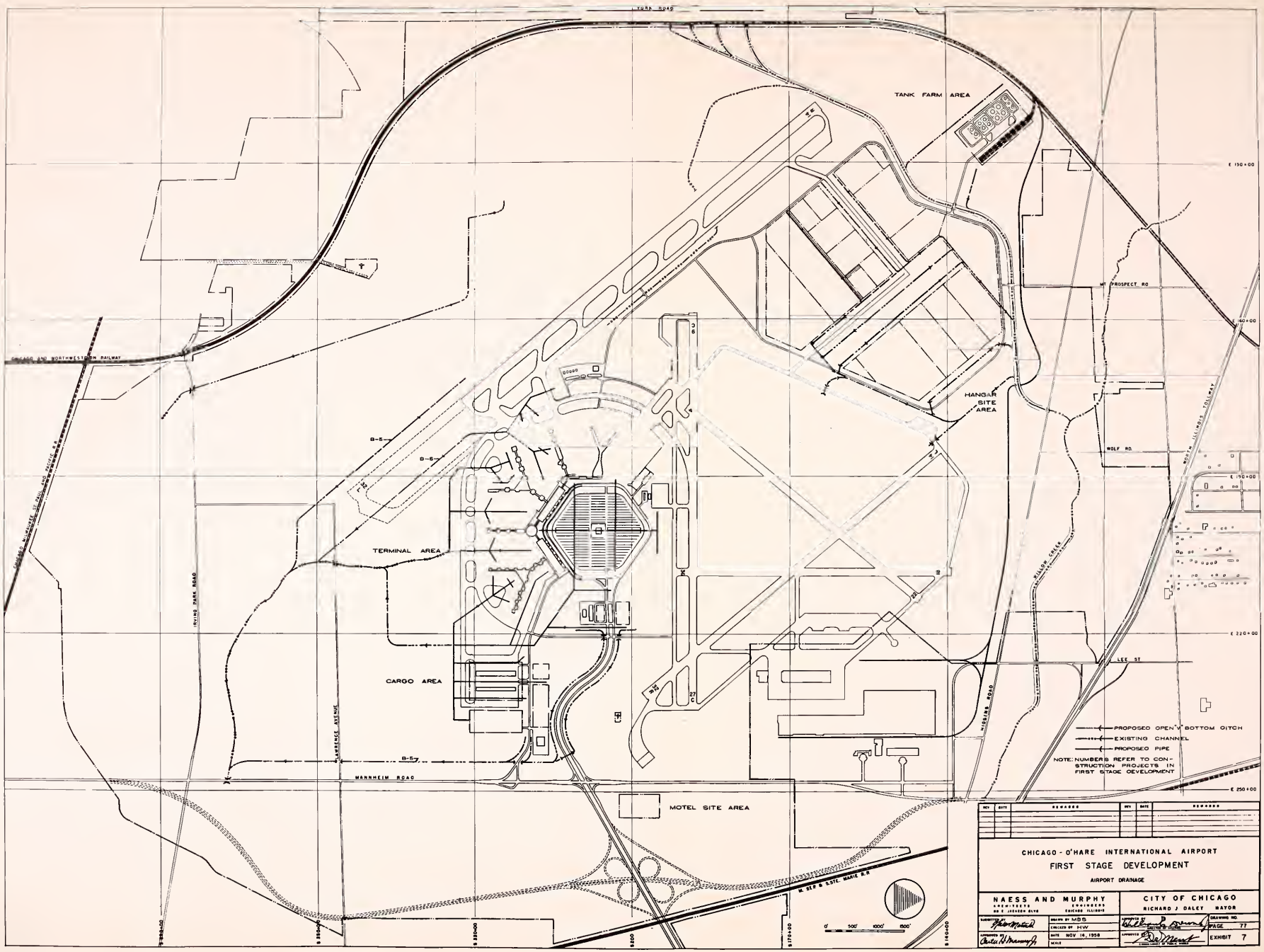
CHICAGO - O'HARE INTERNATIONAL AIRPORT

FIRST STAGE DEVELOPMENT

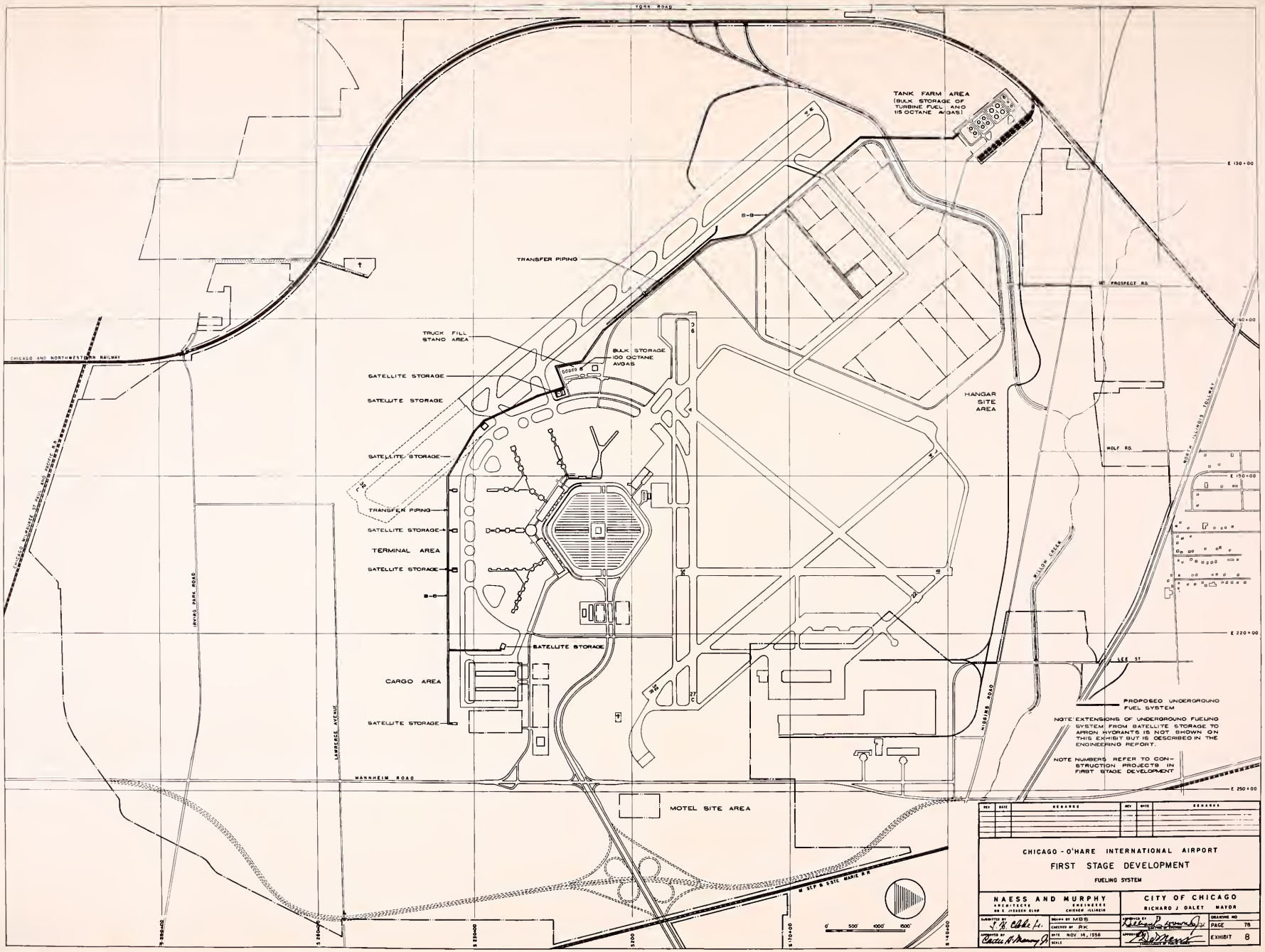
MASTER PLAN
CHILLED WATER

NAESS AND MURPHY	CITY OF CHICAGO
ARCHITECTS ENGINEERS 20 E. JACKSON BLVD. CHICAGO ILLINOIS	RICHARD J DALEY MAYOR
SUBMITTED BY F. J. Clarke Jr.	DRAWN BY MGS CHECKED BY RHC
APPROVED BY Carter H. Harrison	DATE NOV 14, 1958 SCALE
APPROVED BY Wilbur S. Sounds COMMISSIONER OF PUBLIC WORKS	DRAWING NO PAGE 76 EXHIBIT 6
APPROVED BY Ben Mena COMMISSIONER OF PUBLIC WORKS	


CHICAGO MILWAUKEE ST PAUL AND PACIFIC R.R.
CHICAGO AND NORTH WESTERN R.R.


TANK FARM AREA
HANGAR SITE AREA
TERMINAL AREA
CARGO AREA
MOTEL SITE AREA
MT PROSPECT RD
WOLF RD
LEE ST
MANNHEIM ROAD
THIRD PARK ROAD
LAWRENCE AVENUE
MILLER CREEK
CHICAGO AND NORTHWESTERN RAILWAY
PROPOSED OPEN V BOTTOM DITCH
EXISTING CHANNEL
PROPOSED PIPE
NOTE: NUMBERS REFER TO CONSTRUCTION PROJECTS IN FIRST STAGE DEVELOPMENT
CHICAGO - O'HARE INTERNATIONAL AIRPORT
FIRST STAGE DEVELOPMENT
AIRPORT DRAINAGE
NAESS AND MURPHY
ENGINEERS
CITY OF CHICAGO
RICHARD J DALEY MAYOR
DRAWN BY MBS
CHECKED BY HW
DATE NOV 16, 1958
SCALE
DRAWING NO.
PAGE 77
EXHIBIT 7

CHICAGO AND NORTHWESTERN R
CHICAGO, MILWAUKEE, ST. PAUL AND PACIFIC R.R.



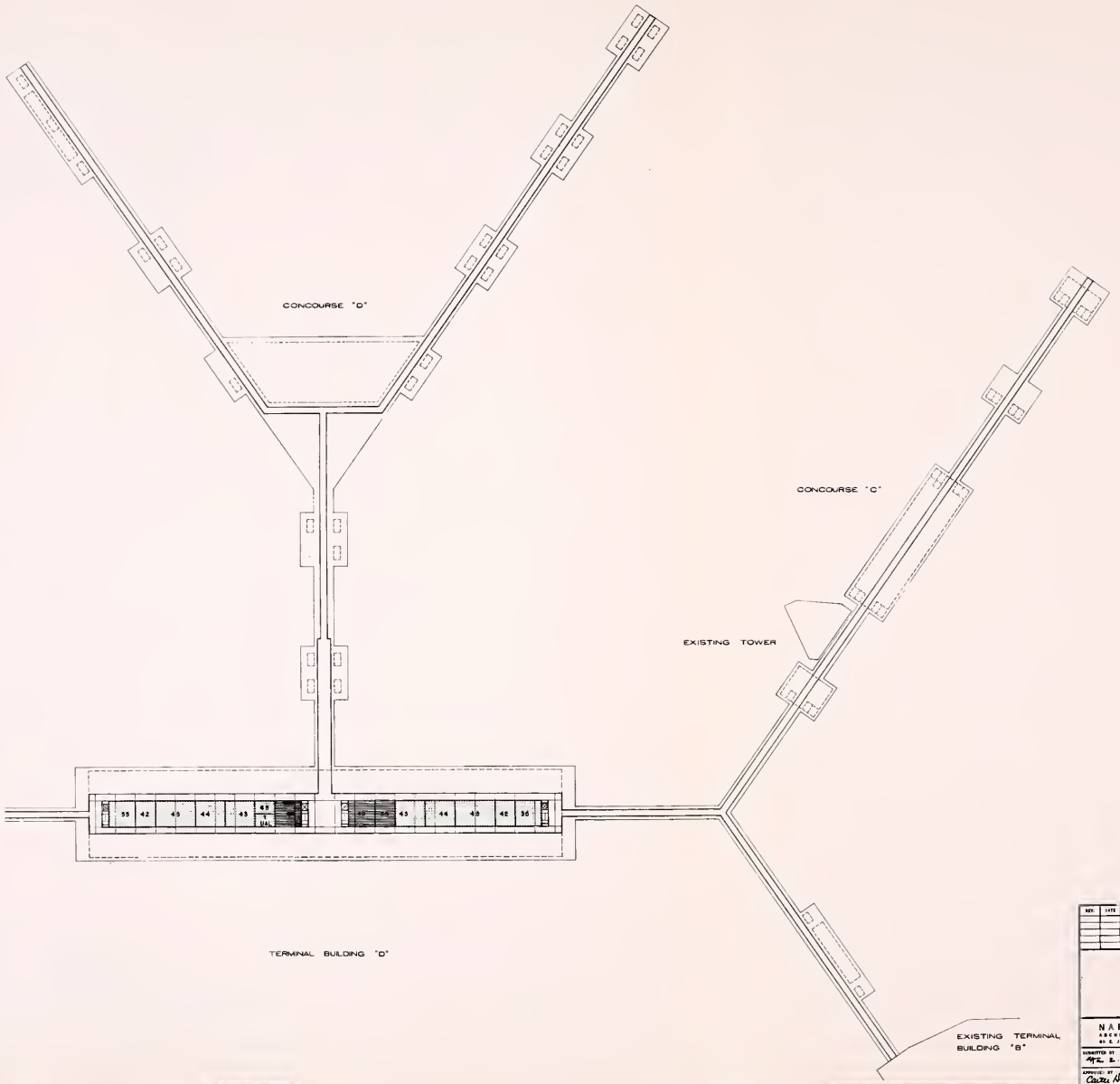
REV	DATE	REMARKS	REV	DATE	REMARKS

CHICAGO - O'HARE INTERNATIONAL AIRPORT

FIRST STAGE DEVELOPMENT

FUELING SYSTEM

NAESS AND MURPHY ARCHITECTS ENGINEERS 66 E JACKSON BLVD CHICAGO ILLINOIS		CITY OF CHICAGO RICHARD J DALEY MAYOR	
SUBMITTED BY J. H. Cable Jr.	DRAWN BY MBS	APPROVED BY P. Brown Jr. COMMISSIONER OF AVIATION	DRAWING NO
	CHECKED BY RJK		PAGE 78
APPROVED BY Charles H. Murphy Jr.	DATE NOV. 14, 1958	APPROVED BY Richard J. Daley MAYOR OF CHICAGO	EXHIBIT 8
	SCALE		


CONCOURSE "D"
CONCOURSE "C"
EXISTING TOWER
TERMINAL BUILDING "D"
EXISTING TERMINAL BUILDING "B"
55 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56
0' 50' 100' 150' 200'

	AIRLINE SPACE	AREA
1.	OUT BAGGAGE	600
	CONCESSION SPACE	**AREA**
35	STORAGE	3,200
	BUILDING MAINT & MAINT SPACE	**AREA**
39	JANITOR'S SPACE	1,200
40	EMPLOYEE TOILETS	3,200
42.	STORAGE	2,400
43.	MECHANICAL	3,600
44	ELECTRICAL	3,600
45	UNASSIGNED	5,400

REV.	DATE	REMARKS	REV.	DATE	REMARKS

CHICAGO - O'HARE INTERNATIONAL AIRPORT

SPACE ASSIGNMENT

TERMINAL BUILDING "D" AND CONCOURSES

BASEMENT PLAN

NAESS AND MURPHY
ENGINEERS
ARCHITECTS
80 E. JACKSON BLVD. CHICAGO, ILLINOIS

SUBMITTED BY: [signature]

APPROVED BY: [signature]

DRAWN BY Y. C.
CHECKED BY Y. C. H. S.
DATE NOV. 14, 1958
SCALE

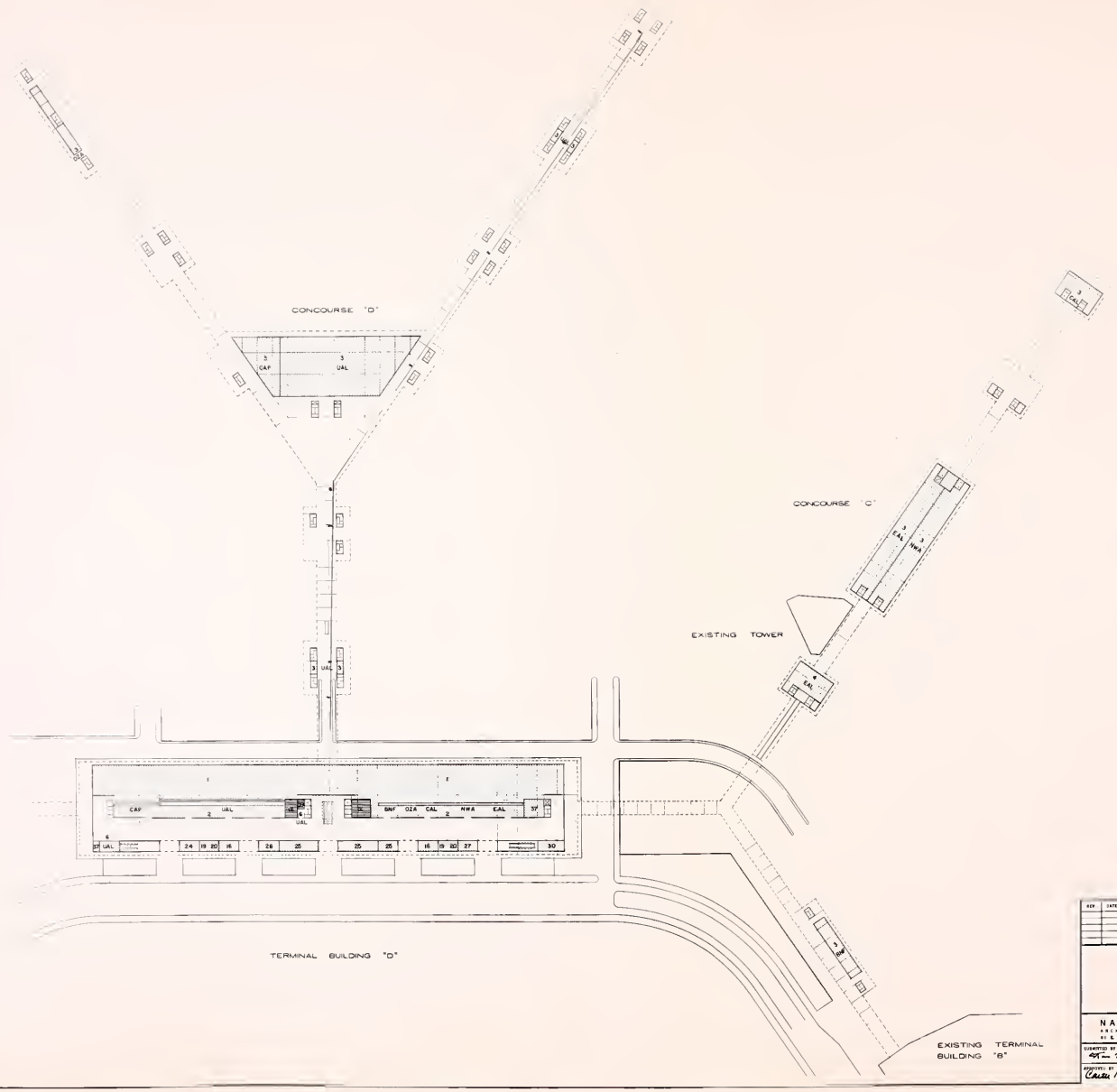
CITY OF CHICAGO
RICHARD J. DALEY MAYOR

APPROVED [signature]
COMMISSIONER OF AVIATION

APPROVED [signature]
CHIEF ENGINEER

DRAWING NO. PAGE 79

EXHIBIT 9



	AIRLINE SPACE	AREA
1	OUT BAGGAGE	26,775
2	CLAIM BAGGAGE	12,170
3	OPERATION	36,494
4	HOLD AREA	2,700
5	MISC AREA	600

	CONCESSION SPACE	AREA
12	WASHROOMS	1,500
16	NEWS, MAG., TOBACCO	900
19	TELEPHONES	450
20	BAGGAGE LOCKERS	450
24	AMUSEMENT MACHINES	450
25	RENT-A-CAR	1,800
26	HOTEL RESERVATIONS	900
27	GUIDED TOURS	450
30	VALET SERVICE	600
37	PORTER RM & BAG STOR	1,050

	BUILDING MGMT. & MAINT SPACE	AREA
39	JANITOR'S SPACE	150

0' 50' 100' 150' 200'

REV.	DATE	REMARKS	REV.	DATE	REMARKS

CHICAGO - O'HARE INTERNATIONAL AIRPORT

SPACE ASSIGNMENT

TERMINAL BUILDING "D" AND CONCOURSES

FIRST FLOOR PLAN

NAESS AND MURPHY
ARCHITECTS
80 E. JACKSON BLVD.
ENGINEERS
CHICAGO, ILLINOIS

SUBMITTED BY

APPROVED BY

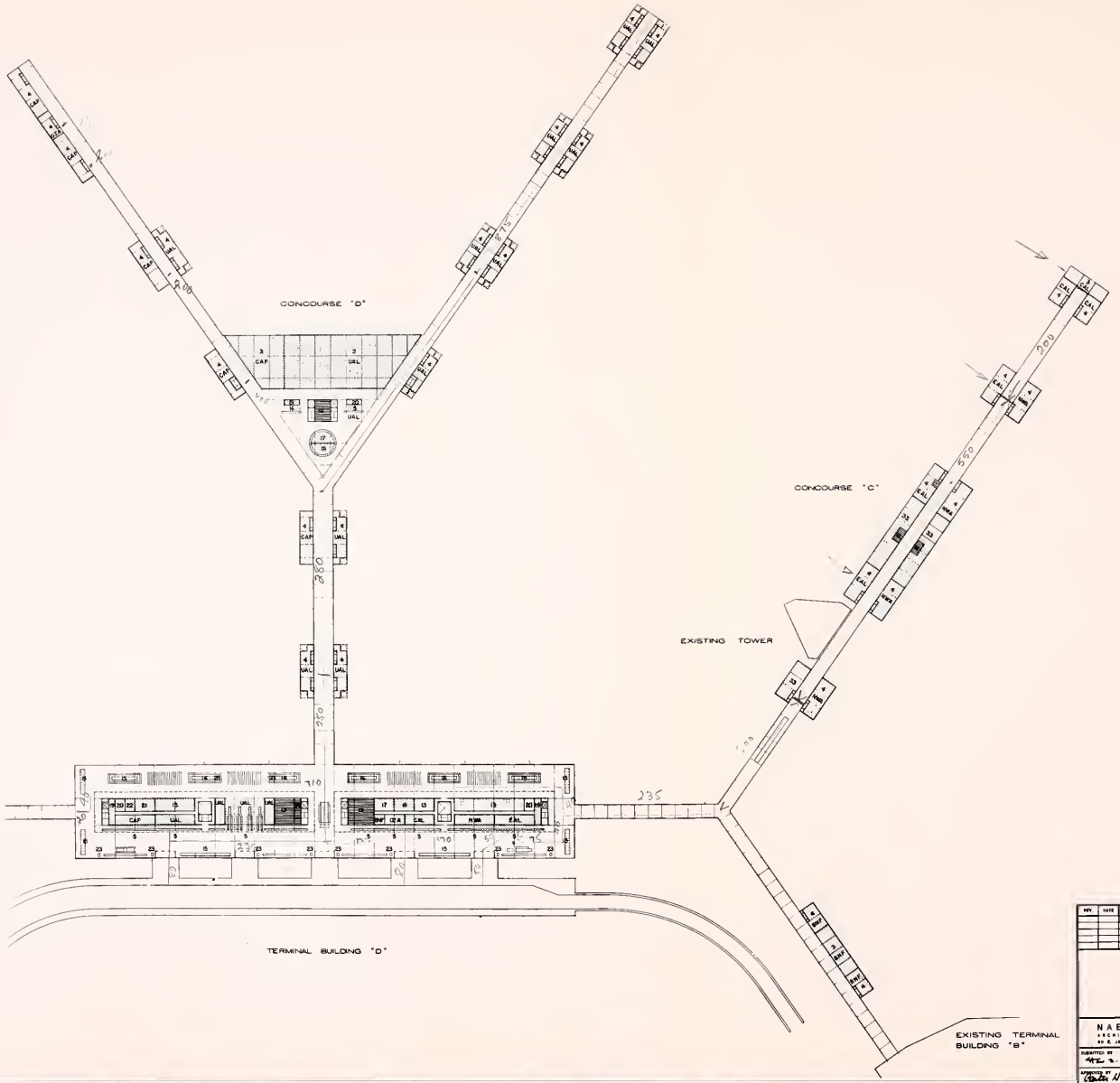
DRAWN BY Y.C.
CHECKED BY Y.C. M.S.
DATE NOV. 16, 1959
SCALE

CITY OF CHICAGO
RICHARD J. DALEY, MAYOR

APPROVED BY
DEPUTY COMMISSIONER

APPROVED BY
COMMISSIONER OF AVIATION

DRAWING NO.
PAGE 80
EXHIBIT 10



	AIRLINE SPACE	AREA
3	OPERATION AREA	19,546
4	HOLD AREA	37,000
5.	TICKET AREA	13,862
	CONCESSION SPACE	**AREA**
12.	WASHROOMS	4,059
13	SHOPS - GEN'L. MERCH	3,900
14	GEN'L MERCH	1,350
15	DISPLAY	3,450
16	NEWS, MAGAZINES, TOBACCO	1,684
17	QUICKIE BAR	1,228
18	SNACK BAR	1,228
19	TELEPHONES	972
20	BAGGAGE LOCKERS	772
21.	BARBER SHOP	600
22	BOOT BLACK	300
23	TRIP INSURANCE	270
33	RENTAL AREA	6,600
	BUILDING MGM'T & MAINT SPACE	**AREA**
39	JANITOR'S SPACE	300

REV.	DATE	REMARKS	REV.	DATE	REMARKS

CHICAGO - O'HARE INTERNATIONAL AIRPORT

SPACE ASSIGNMENT

TERMINAL BUILDING "D" AND CONCOURSES

SECOND FLOOR PLAN

NAESS AND MURPHY
ARCHITECTS ENGINEERS
80 E. JACKSON BLVD CHICAGO, ILLINOIS

SUBMITTED BY

APPROVED BY

DRAWN BY E.R.
CHECKED BY Y.C. H.S.
DATE NOV 14, 1958
SCALE

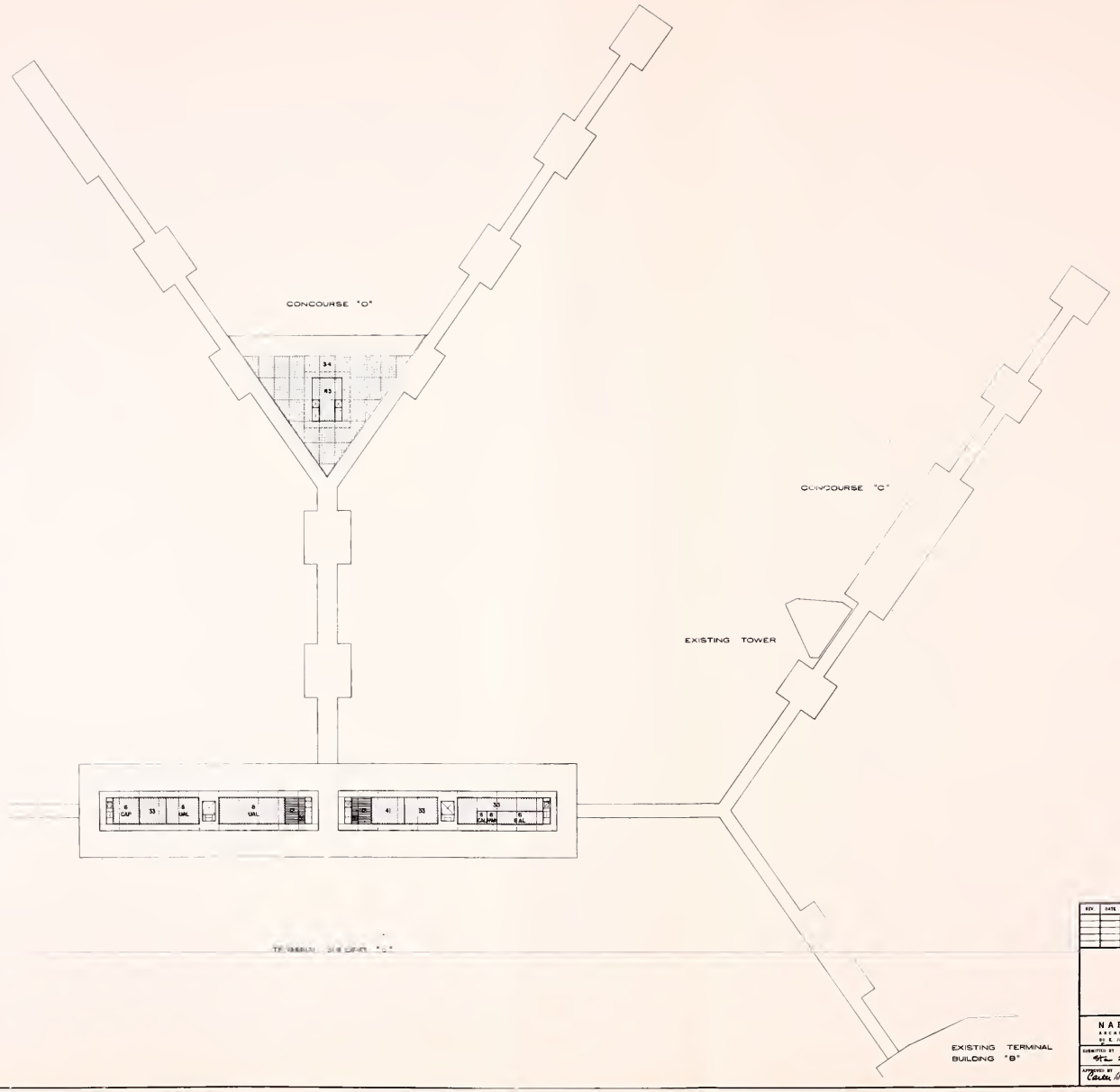
CITY OF CHICAGO
RICHARD J. DALEY MAYOR

APPROVED BY Commissioner of Aviation

APPROVED BY Commissioner of Public Works

DRAWING NO. PAGE 61

EXHIBIT II



	AIRLINE SPACE	AREA
6	MISC. AREA	8,550
	CONCESSION SPACE	**AREA**
12	WASHROOMS	2,000
33	RENTAL AREA	6,800
34	OBSERVATION DECK	19,932
	BUILDING MGM'T & MAINT. SPACE	**AREA**
39	JANITORS SPACE	400
41	TELEPHONE EQUIP	2,000
43	MECHANICAL	2,178

0' 50' 100' 150' 200'

REV.	DATE	REMARKS	REV.	DATE	REMARKS

CHICAGO - O'HARE INTERNATIONAL AIRPORT

SPACE ASSIGNMENT

TERMINAL BUILDING "D" AND CONCOURSES

MEZZANINE PLAN

NAESS AND MURPHY
ARCHITECTS ENGINEERS
80 E. JACKSON BLVD. CHICAGO, ILLINOIS

CITY OF CHICAGO
RICHARD J. DALEY MAYOR

SUBMITTED BY

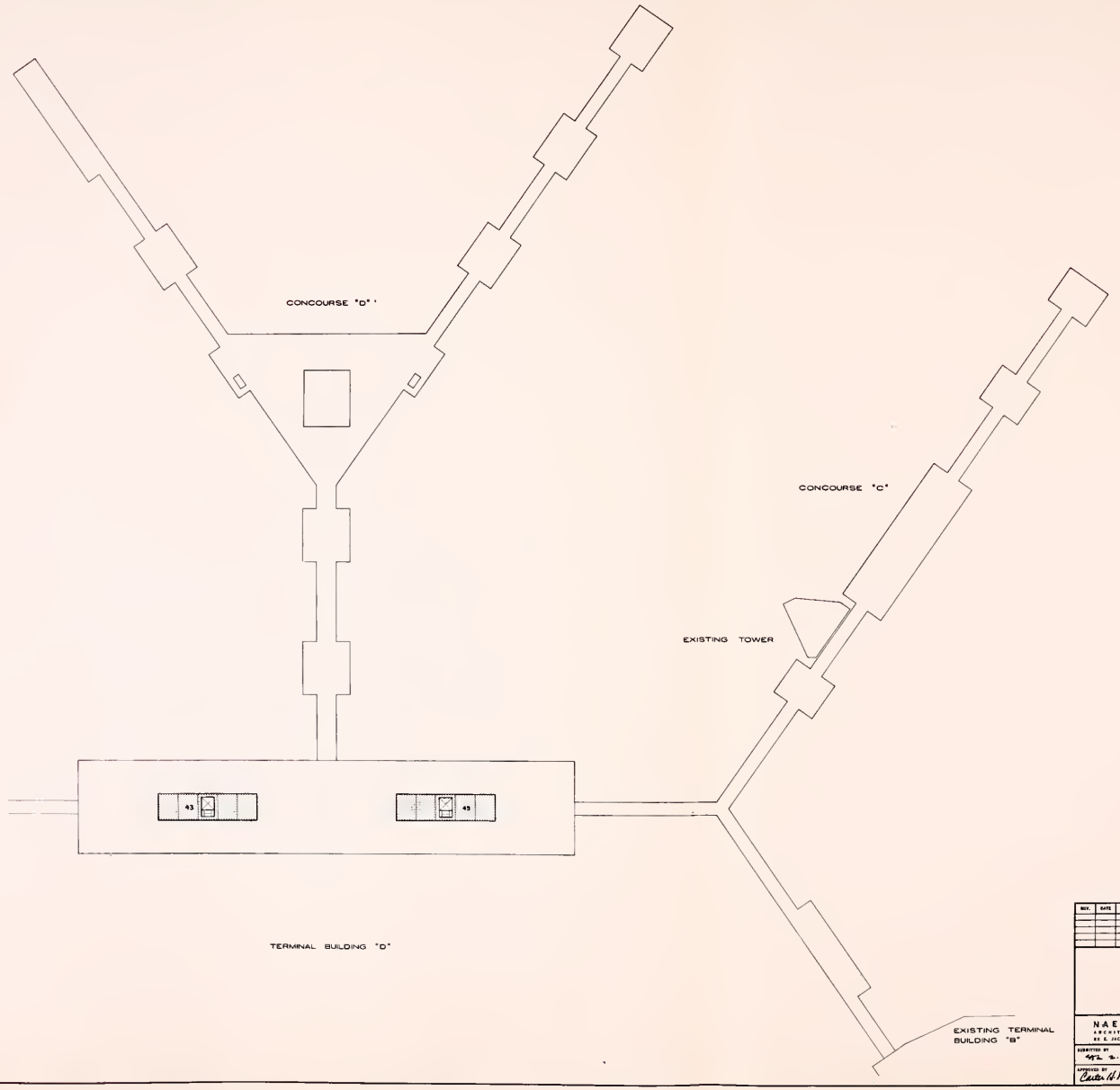
DRAWN BY C.D.
CHECKED BY Y.C. H.S.
DATE NOV 14, 1958
SCALE

APPROVED BY

APPROVED BY

APPROVED BY

DRAWING NO.
PAGE 82
EXHIBIT 12



BUILDING MGMT. & MAINT. SPACE		AREA
43	MECHANICAL	10,800

0' 50' 100' 150' 200'

NO.	DATE	REMARKS	NO.	DATE	REMARKS

CHICAGO - O'HARE INTERNATIONAL AIRPORT

SPACE ASSIGNMENT

TERMINAL BUILDING "D" AND CONCOURSES

ROOF PLAN

NAESS AND MURPHY
ARCHITECTS ENGINEERS
66 E. JACKSON BLVD. CHICAGO, ILLINOIS

SUBMITTED BY: [signature]

DRAWN BY: C.H.
CHECKED BY: E.R. H.S.
DATE: NOV. 14, 1958
SCALE:

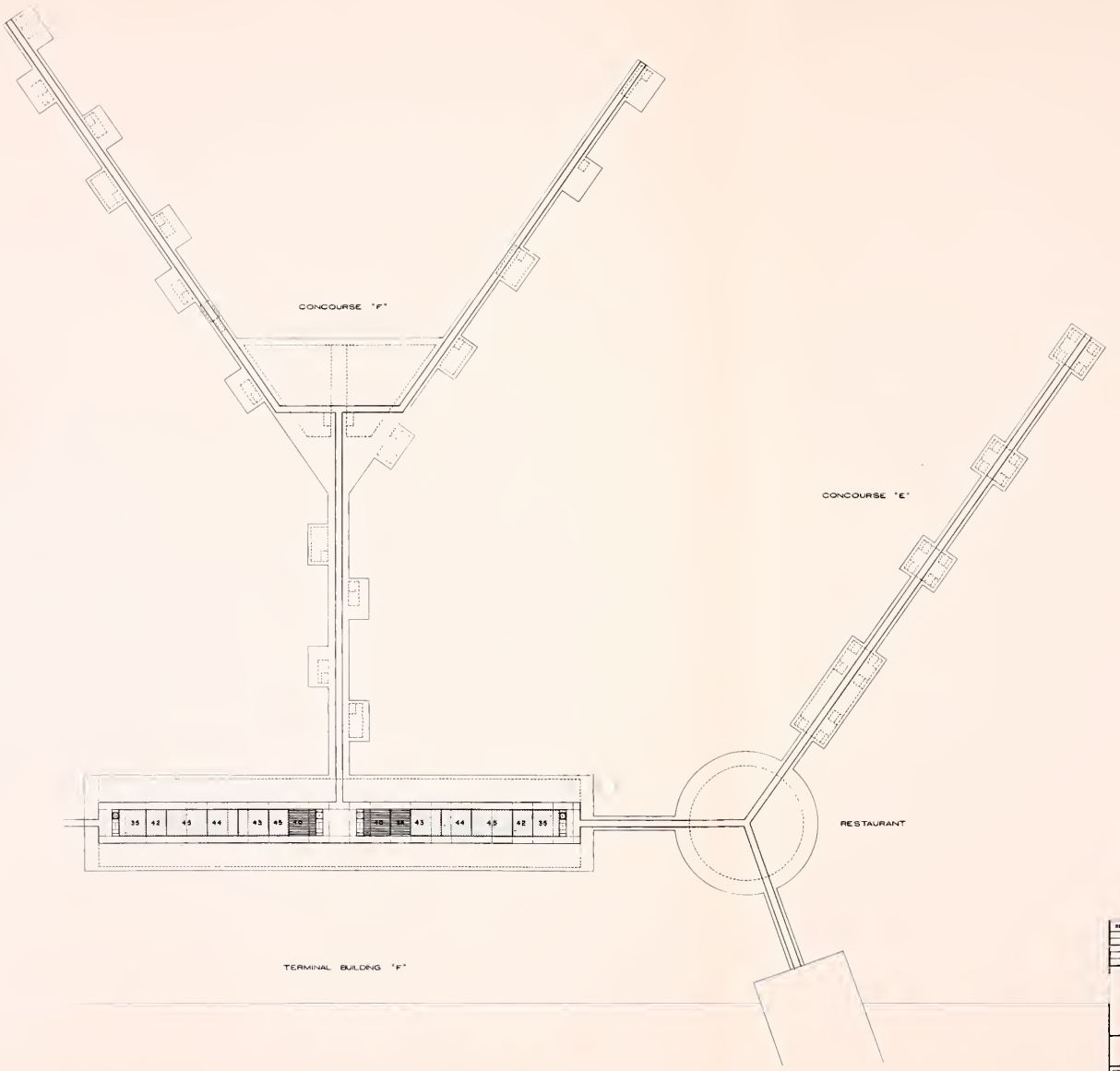
APPROVED BY: Chester H. Murphy Jr.

CITY OF CHICAGO
RICHARD J. DALEY MAYOR

APPROVED BY: [signature] COMMISSIONER OF AVIATION

APPROVED BY: [signature] COMMISSIONER OF PUBLIC WORKS

DRAWING NO.
PAGE 83
EXHIBIT 13



	CONCESSION SPACE	AREA
35	STORAGE	3,200

	BUILDING MGM'T & MAINT. SPACE	AREA
35	JANITORS SPACE	1,200
40	EMPLOYEE TOILETS	3,200
42	STORAGE	2,400
43	MECHANICAL	3,600
44	ELECTRICAL	3,600
45	UNASSIGNED	6,000

0' 50' 100' 150' 200'

REV.	DATE	REMARKS	REV.	DATE	REMARKS

CHICAGO - O'HARE INTERNATIONAL AIRPORT

SPACE ASSIGNMENT

TERMINAL BUILDING "F" AND CONCOURSES

BASEMENT PLAN

NAESS AND MURPHY
ARCHITECTS ENGINEERS
311 S. JACKSON BLVD. CHICAGO, ILLINOIS

CITY OF CHICAGO
RICHARD J. DALEY MAYOR

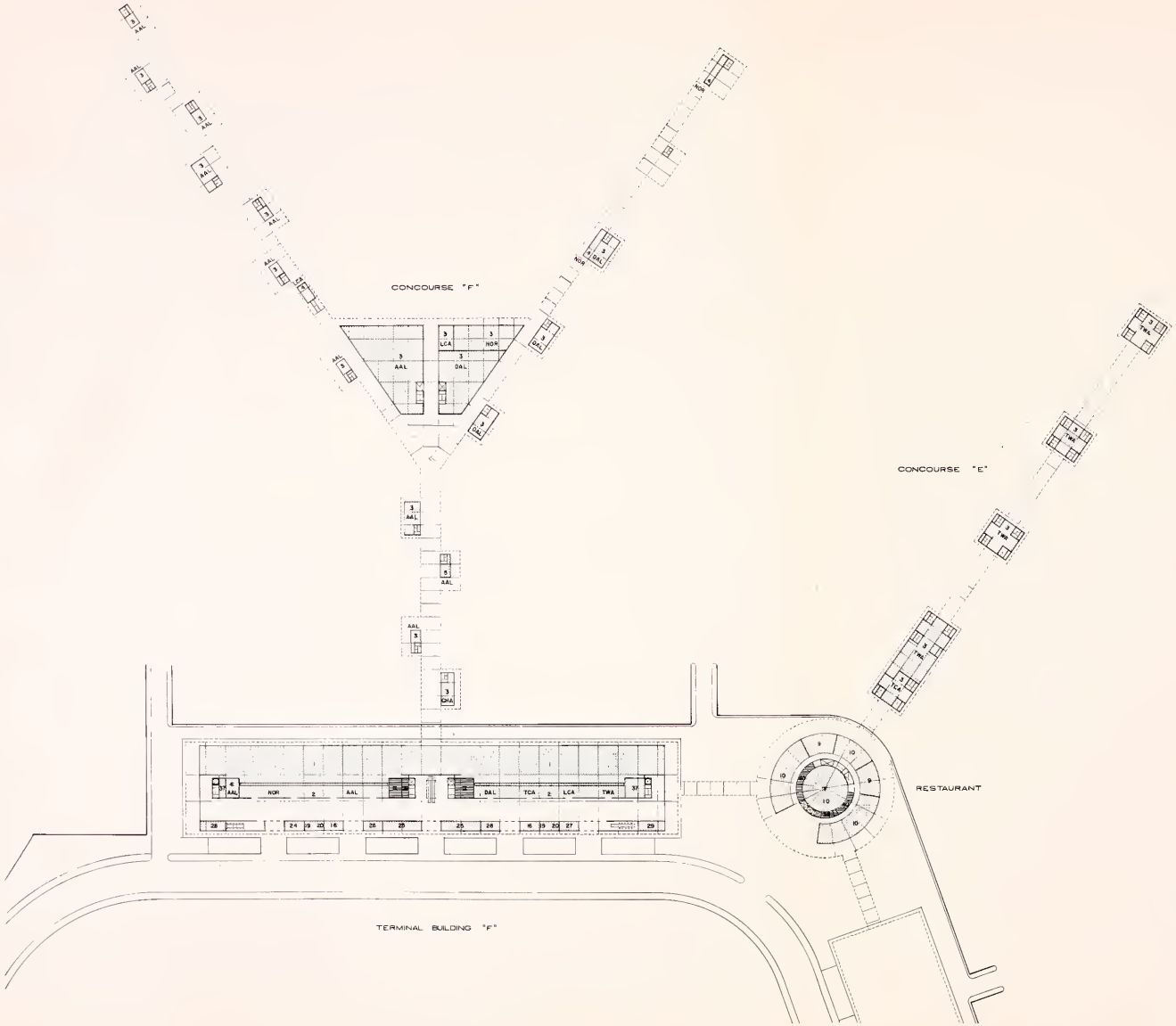
SUBMITTED BY

APPROVED BY Carter H. Murray Jr.

DRAWN BY C.H.
CHECKED BY E.R. H.S.
DATE NOV 14, 1958
SCALE

APPROVED BY
COMMISSIONER OF PUBLIC WORKS

DRAWING NO.
PAGE 84
EXHIBIT 14



	AIRLINE SPACE	AREA
1	OUT BAGGAGE	21,860
2	CLAIM BAGGAGE	9,626
3	OPERATION	42,623
4	HOLD AREA	1,250
6	MISC AREA	500
	CONCESSION SPACE	**AREA**
9	EMPLOYEES CAFETERIA	2,966
10	KITCHEN & STORAGE	12,083
11	LOADING	2,448
12	WASHROOMS	1,500
16	NEWS, MAG ,TOBACCO	900
19	TELEPHONES	450
20	BAGGAGE LOCKERS	450
24	AMUSEMENT MACHINES	450
25	RENT-A-CAR	1,800
26	HOTEL RESERVATIONS	900
27	GUIDED TOURS	450
28	LIMOUSINE ROOM	600
29	SUB-POST OFFICE	600
37	PORTERS RM & BAG STOR	1,200
	BUILDING MGMT. & MAINT. SPACE	**AREA**
39	JANITORS SPACE	488
40	EMPLOYEES TOILETS	1,062

0' 50' 100' 150' 200'

REV.	DATE	REMARKS	REV	DATE	REMARKS

CHICAGO - O'HARE INTERNATIONAL AIRPORT

SPACE ASSIGNMENT

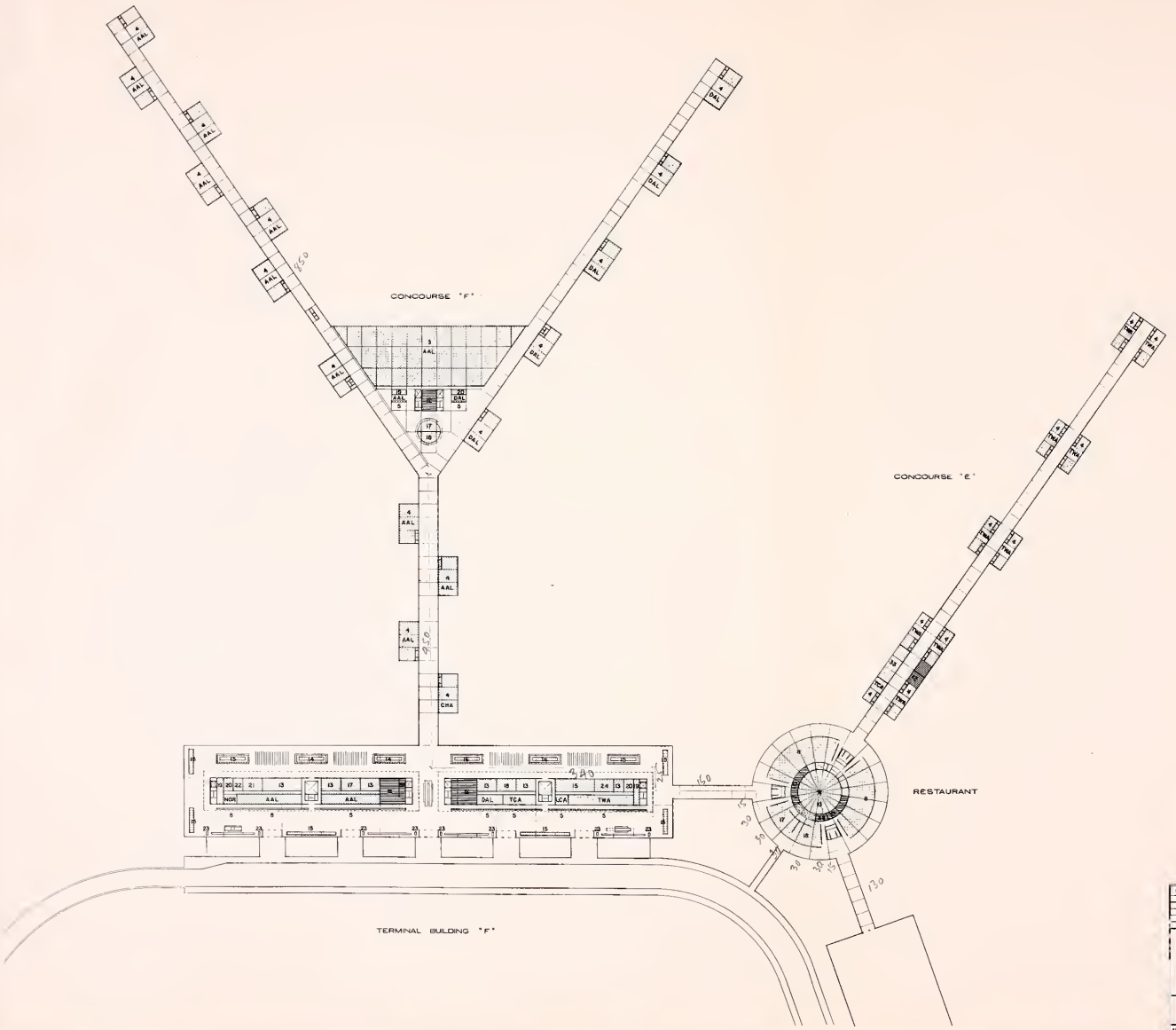
TERMINAL BUILDING "F" AND CONCOURSES
FIRST FLOOR PLAN

NAESS AND MURPHY
ARCHITECTS ENGINEERS
85 E. JACKSON BLVD. CHICAGO, ILLINOIS

CITY OF CHICAGO
RICHARD J. DALEY MAYOR

SUBMITTED BY: Naess & Murphy
DRAWN BY: H. S.
CHECKED BY: Y. C. H. S.
APPROVED BY: Walter H. Murphy Jr.
DATE: NOV 14, 1958
SCALE:
APPROVED BY: Richard J. Daley, MAYOR OF THE CITY OF CHICAGO
APPROVED BY: D. Wells, COMMISSIONER OF PUBLIC WORKS

DRAWING NO. PAGE 85
EXHIBIT 15



	AIRLINE SPACE	AREA
3	OPERATION AREA	20,310
4	HOLD AREA	38,575
5	TICKET AREA	12,102
	CONCESSION SPACE	**AREA**
9	COFFEE SHOP	8,704
10	KITCHEN & STORAGE	3,846
12	WASHROOMS	5,522
13	SHOPS - GENL. MERCH.	5,100
14	GENL. MERCH.	1,500
15	DISPLAY	3,450
16	NEWS MAG TOBACCO	1,500
17	QUICKIE BAR	2,996
18	SNACK BAR	2,996
19	TELEPHONES	972
20	BAGGAGE LOCKERS	772
21	BARBER SHOP	600
22	BOOT BLACK	300
23	TRIP INSURANCE	120
24	AMUSEMENT MACHINES	600
33	RENTAL	1,200
	BUILDING MGMT. & MAINT. SPACE	**AREA**
39	JANITORS SPACE	480

0' 50' 100' 150' 200'

REV.	DATE	REMARKS	REV.	DATE	REMARKS

CHICAGO - O'HARE INTERNATIONAL AIRPORT

SPACE ASSIGNMENT

TERMINAL BUILDING "F" AND CONCOURSES

SECOND FLOOR PLAN

NAESS AND MURPHY
ARCHITECTS ENGINEERS
80 E. JACKSON BLVD. CHICAGO, ILLINOIS

CITY OF CHICAGO
RICHARD J. DALEY MAYOR

SUBMITTED BY: [illegible]
DRAWN BY H.S.
CHECKED BY Y.C. H.S.
DATE NOV 14, 1958
SCALE

APPROVED BY: [illegible]
COMMISSIONER OF AVIATION

APPROVED BY: D. D. Kent
COMMISSIONER OF PUBLIC WORKS

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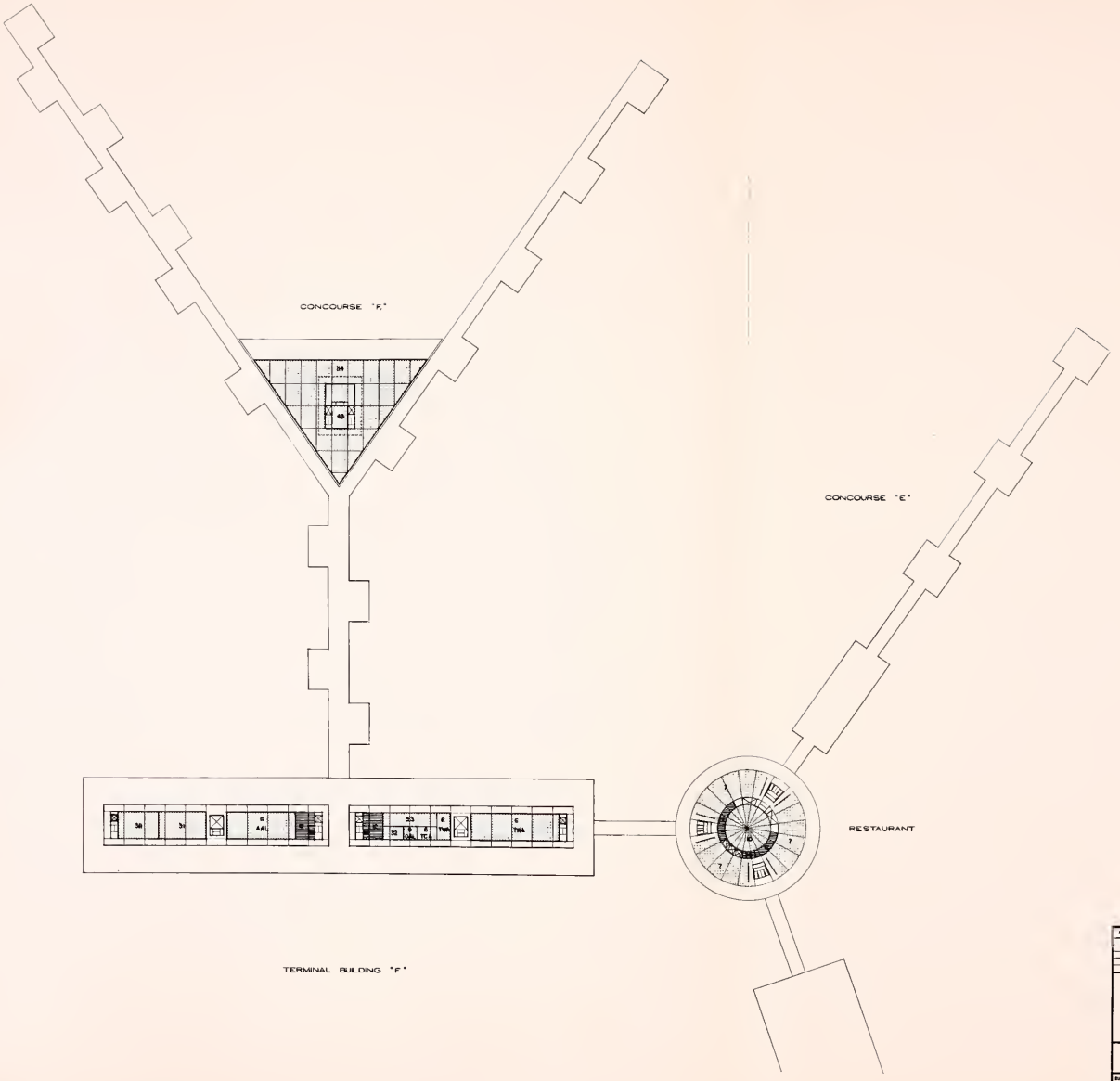
EXHIBIT 16



	AIRLINE SPACE	AREA
6	MISC. AREA	10,109
	CONCESSION SPACE	**AREA**
7.	DINING & COCKTAILS	12,240
10.	KITCHEN & STORAGE	3,848
12	WASHROOMS	3,062
31.	CONF. RMS & STENOG.	2,800
32.	PROFESSIONAL OFFICES	600
33	RENTAL AREA	1,600
34.	OBSERVATION DECK	10,932
	BUILDING MGM'T. & MAINT. SPACE	**AREA**
38	MGM'T OFFICES	2,400
39	JANITOR'S SPACE	366
43.	MECHANICAL	2,178

0' 30' 100' 150' 200'

REV.	DATE	REMARKS	REV.	DATE	REMARKS

CHICAGO - O'HARE INTERNATIONAL AIRPORT

SPACE ASSIGNMENT

TERMINAL BUILDING "F" AND CONCOURSES
MEZZANINE PLAN

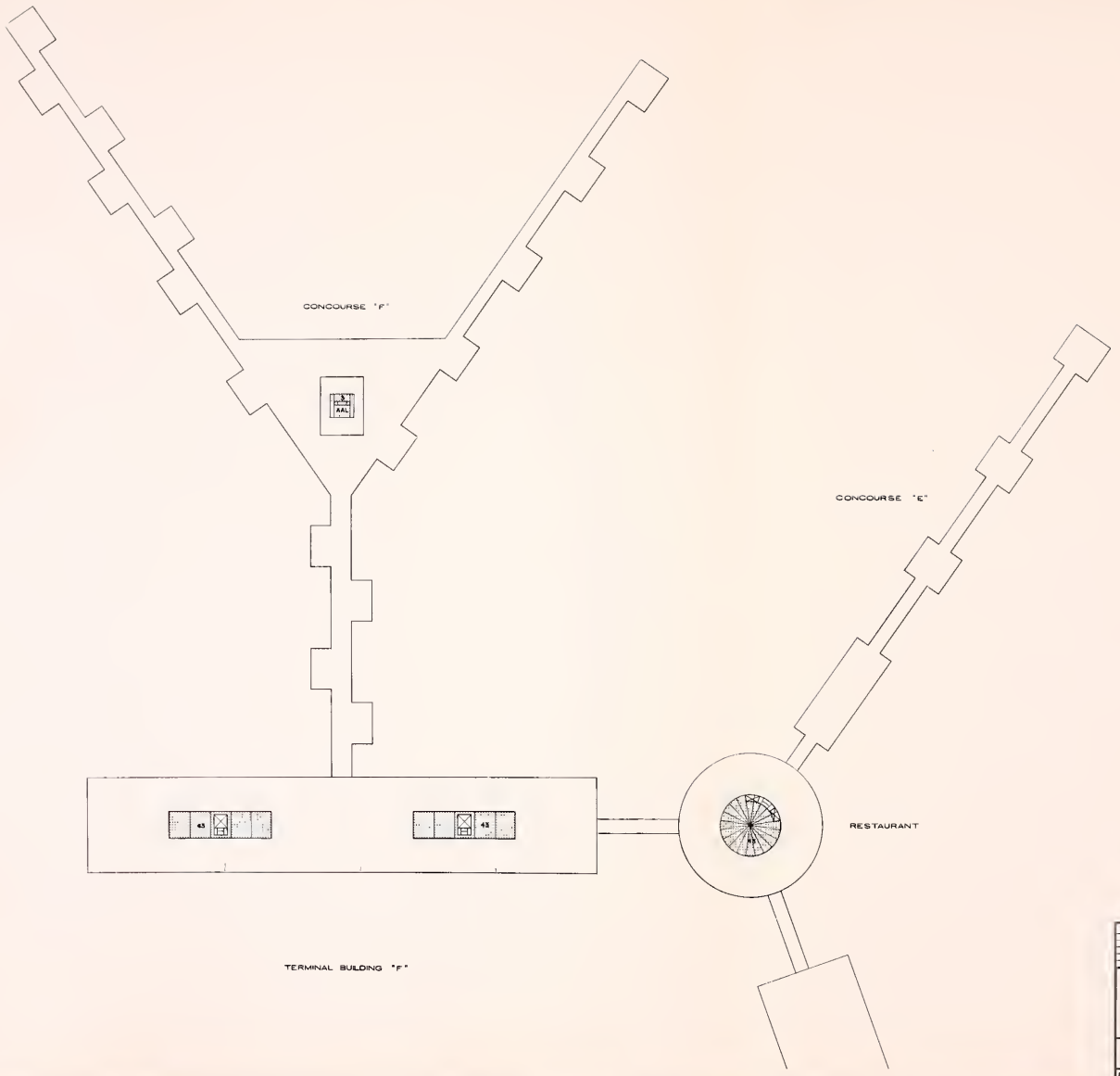
NAESS AND MURPHY
ARCHITECTS
ENGINEERS
CHICAGO, ILLINOIS

CITY OF CHICAGO
RICHARD J. DALEY MAYOR

SUBMITTED BY
DRAWN BY C.J.
CHECKED BY Y.C. H.S.
DATE NOV. 14, 1958
SCALE

APPROVED BY
APPROVED BY
APPROVED BY

DRAWING NO.
PAGE 87
EXHIBIT 17



	AIRLINE SPACE	AREA
3	OPERATION AREA	800
	BUILDING MGM'T & MAINT SPACE	AREA
43	MECHANICAL	16,543

0' 50' 100' 150' 200'

REV.	DATE	REMARKS	REV.	DATE	REMARKS

CHICAGO - O'HARE INTERNATIONAL AIRPORT

SPACE ASSIGNMENT

TERMINAL BUILDING "F" AND CONCOURSES

ROOF PLAN

NAESS AND MURPHY
ARCHITECTS ENGINEERS
99 E. JACKSON BLVD. CHICAGO, ILLINOIS

CITY OF CHICAGO
RICHARD J. DALEY MAYOR

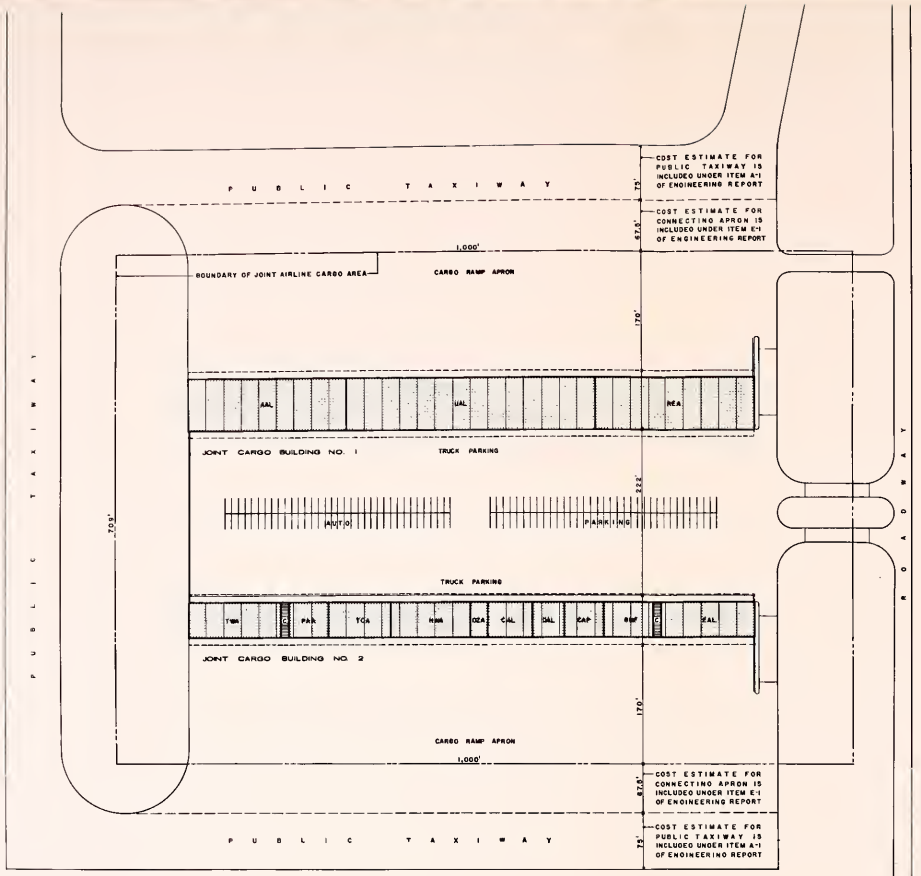
SUBMITTED BY

DRAWN BY G. J.
CHECKED BY Y. C. H. S.
DATE NOV. 14, 1958
SCALE

APPROVED BY

APPROVED BY

DRAWING NO.
PAGE 85
EXHIBIT 18



AIRLINE'S CARGO BUILDING SPACE

BUILDING NO. 1	
AAL	18,352
UAL	24,192
BUILDING NO. 2	
TWA	8,048
PAA	2,880
TCA	5,744
NWA	5,184
OZA	1,152
CAL	2,880
OAL	2,018
CAP	2,592
BNF	3,168
EAL	8,048
COMMON USE SPACE (C)	1,152

RAILWAY EXPRESS AGENCY SPACE

BUILDING NO 1	
REA	15,552

0' 50' 100' 150' 200'

SECTION 1/16"=1'-0"

NUM.	DATE	REMARKS	NUM.	DATE	REMARKS

CHICAGO O'HARE INTERNATIONAL AIRPORT

AIRLINE SPACE ASSIGNMENT

AIRLINE'S CARGO BUILDING SPACE

NAESS AND MURPHY
ARCHITECTS — ENGINEERS
66 E. JACKSON BLVD. CHICAGO, ILLINOIS

CITY OF CHICAGO
RICHARD J. DALEY MAYOR

SUBMITTED BY [signature]
DRAWN BY E R
CHECKED BY C O L
DATE NOV 14, 1958
SCALE
APPROVED BY [signature]
DRAWING NO.
PAGE 89
EXHIBIT 19

3 5556 032 760886

DEMCO